# ARTISAN

OCTOBER 1959

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Contonts . . . Page 4

. The Magazine of

CENTRAL RESIDENTIAL AIR CONDITIONING

WARM AIR HEATING . SHEET METAL CONTRACTING

Special roport on-

### ELECTRIC HOME HEATING

- . Where Does It Sterne New?
- . Where to it Goines?
- A William to 14 Co.L.13
- a Ham to to to 189
- . "Liefe The or John Ten"!

... beains on poge 35

design, specify, inst If service heating equipment ill find these technical brochures on the control of draft an important aid.

May we send you copies?

Handbook and Installation Guide



#### FIELD CONTROL DIVISION

H. D. Conkey & Company - Mendota, Illinois

AFFILIATED

Conco Building Products, Inc. — Brick, Tile, Stone
Conco Materials Handling Division — Cranes, Hoists
Spartan Tool Division — Sewer Cleaning Equipment

Specification Guide





That's right. Now you can install genuine PLIOTRON filters—long the finest available—without asking premium prices. In fact, the new PLIOTRON CR filters—newly improved for greater-than-ever effectiveness—are priced to sell right down with most ordinary types.

And many an installer already knows what business builders PLIOTRON filters are. Once a user discovers the incomparable efficiency of these depth-loaders—not just surface-loaders like ordinary filters—he's usually sold on PLIOTRON. The far, far longer life and easy vacuum-cleaner cleaning of these super-filters are the clinchers.

So it's easy to see what the new and modest PLIOTRON prices can mean to you. Now — as never before — you have the opportunity of making filter installations that are bound to build your business. You'll be surprised at how fast word on these superior filters gets around—how one job leads to another.

For PLIOTRON filters with their superior performance have long been the filteruser's best buy. At their new low price, they're the biggest news in filters in years. For complete details on PLIOTRON CR filters, write Goodyear, P. O. Box 288, Akron, Ohio.

Pliotron − T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

leaner air everywhere-

PLIOTRON CR AIR FILTER BY

GOODFYEAR

THE GREATEST NAME IN RUBBER

# ARTISAN

. . . The Magazine of

CENTRAL RESIDENTIAL AIR CONDITIONING
WARM AIR HEATING • SHEET METAL CONTRACTING

### OCTOBER 1959

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# PROFITS N

selling new

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Electric Humidifier

**Built-in heating element** gives positive evaporation

Can be installed quickly anytime - in plenum, supply, or return duct of any forced-air system.

Brings you additional profits on new-home and replacement furnace sales.

Gets you into the basement - helps you uncover new-furnace prospects.

Gives servicemen an item they can sell on their calls - even carry with them,

Evaporates up to 26 quarts per day - enough to maintain proper humidity level in 2,000-sq. ft. house of average construction.





- 1. Attractive gold, scratch-, scuff-, and corrosion-resistant casing.
- 2. Solenoid water valve electrically actuated by level of water in pan. No needle valve to clog—no float to cause trouble.
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- 4. 800-watt "nichrome" element sheated for corrosion protection. Not affected by scale in most areas of hard water.

Built-in manual control standard. Optional humidistat available for fully automatic control.

Promotion items available to help you sell

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  - · COUNTER CARD AND STAND
    - ROTATING FLOOR STAND
      - · LITERATURE AND MAILERS

The way to extra profits: Have a PLAN for selling Mueller Climatrol Electric Humidifiers. Quote one on every heating installation. Make it worthwhile to your salesmen, servicemen - all employees - to bring in add-on business.

Ask your representative or write for information.

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America's most complete line - Climate Control for healthful living

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CONDITIONERS













### the editor's notebook

#### Thumbing Through This Month's Artisan

. . . we take a good look at a timely subject which will have its effect on everyone in the heating business, in a 20-page Special Report on Electric Home Heating. We study statistics and estimates of the number of existing electric heat installations and review the methods of heating homes electrically to determine the warm air heating dealer-contractor's position in this comparatively new field. We sift a number of modest-to-optimistic estimates of future growth, and study the reasons for and methods of promoting electric heating by the utilities and others who stand to benefit from its growth. We are impressed with the magnitude and results of the utilities' promotions, and intrigued by the sales approaches they employ to overcome the prospect's major objection to high operating costs. We weigh the sales appeals of electric resistance heating against its limitations, and finally we consider the alternatives of: 1) fighting electric heat or 2) taking it on as just another fuel to heat air to be distributed by the tried-and-true forced air methods we know.

#### Exposition

via a 10 page presentation, the 11th Exposition of the Air Conditioning and Refrigeration Industry to be held in Atlantic City Nov. 2-5. We review the array of speakers and their topics at the concurrent conference of ARI and we run through the list of company names and booth numbers of all exhibitors, highlights of displays of heating and air conditioning

# NOW... Divert Air Where You Want It!



### AIR "EXTRACTOR"

This new A-J Air Extractor gives you maximum control of any forced air system. It's not a "damper type" control to meter available air flow through a grille, but a "scoop" that diverts air from the main duct to branch ducts or grilles and increases output over normal flow where needed.

The curved steel blades of the A-J Extractor are adjustable and act in unison to provide a controlled and uniform flow of air into branch ducts. A single key rod provides fast and easy adjustment through the face of a grille or register, and eliminates need for removal. The extractor is sturdily constructed, and fastened in the duct with two screws. Velocity of the air will not alter setting. Write for full information and prices.

#### FREE CATALOG

listing, describing and pricing 1,000 types and sizes of grilles, registers, etc.

### A-J MANUFACTURING CO.

Bept. A-10

3601 E. 18th St.

Kansas City 27, Mo.

### the editor's notebook

(Continued)

equipment and match them to the complete floor plan. We make a mental note to take this guide along with us to the exposition to be sure we don't miss any part of the big show.

#### Transfer

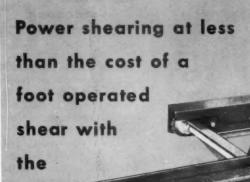
. . . and we review the fundamentals of How Heat Is Transferred, with S. W. Reid, air conditioning engineer-author, who builds an interesting case for increasing our knowledge of heat transfer to develop a working understanding of why we follow the design and engineering rules we take for granted in air conditioning work. We study the types of energy and the ways it is transferred as a preliminary to application discussions which demonstrate the importance of this concept to all phases of our air conditioning work.

#### Guarantees

. . . we go to court with a dealer-contractor who learns that When You Guarantee To Heat Satisfactorily . . . you'd better be able to prove your equipment produced "substantial performance," in the jargon of the courtroom, in order to collect from a dissatisfied customer who won't pay for his installation. We brief several similar cases which brought trouble to other dealer-contractors and we resolve to review our sales contract to check its enforceability and protection features.

#### Dome

the progress of a two-year roofing job in which Georgia's Capital Dome Gets Sheet Metal Face-Lifting. We climb the network of scaffolding, which is pretty impressive in itself, to watch



### **IOCKFORMER**

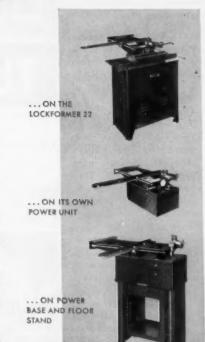
## Slitting Attachment

Slitting Attachment installs on your LOCKFORMER 20, 22 OR 24 in just 10 minutes. Shears as little as \%" or up to 24" from 20 gauge (or lighter) material...does any shearing job on sheets as wide as 48".

Lockformer Slitting Attachment power shears any length and doesn't require additional floor space. Simple and foolproof like the Lockformer itself—and just as accurate, equally rugged.

Portable Power Unit converts Slitter to a self-powered bench model (for on-the-job use, too) ... or add a floor stand and it's a complete shop machine on its own.

Everything you'll want to know about the Portable Slitting Attachment is in the Lockformer Catalog...fill out, clip and mail the coupon for your copy.



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TIME SAVING, MONEY MAKING EQUIPMENT

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Please send me the Lockformer Catalog of sheet metal machinery and Slitting Attachment price.

Name
Address

City\_\_\_\_\_\_State\_\_\_\_\_

### the editor's notebook

the crews install nickel-copper alloy squares over the old tile in a diamond pattern, and inspect the vertical batten seams which help produce the exceptionally low coefficient of expansion required for the job. We are also treated to an interesting sidelight - local citizens panning gold to be converted to leaf for gilding the completed nickel-copper alloy roof

#### Reader Uses Editorial As Malling Piece

HERE'S THE WAY we like to see readers make use of the ideas published in American Artisan

Bloomington, Ill. American Artisan

Gentlemen:

The editorial "Keep Up your Cash Reserves" published in the August American Artisan seems particularly timely. We'd like to prepare reprints for distribution to our customers. If only two out of 50 would put these ideas to use, our mailing would be a howling success. May we have your permission to reproduce this editorial?

Sincerely yours, A. Y. McDonald Mfg. Co. Michael R. Conran, Mgr.

#### TV Film Warns Public **Against Heating Frauds**

DID YOU SEE the television program "The White Collar Bandit" that was presented on the Armstrong Circle Theater on September 2? If you did, I'm sure that you hope, as I do, that the public learned they should deal only with dealer-contractors engaged in operating a legitimate company. The manner in which the crooked sales-



Northville, Michigan

### the editor's notebook

man fleeced his prospects through fear was so realistic it should have made people realize that they should investigate every company that uses this method to force the signing of a contract.

Sales promotional programs that play up the reliability of a company and the high quality of its workmanship should prove most effective.

More television programs designed to help people improve their purchasing habits would be a real service to the public

#### **Planning Customer** Christmas Gifts?

A NUMBER of sheet metal contractors send gifts to their steady customers at Christmas. If you are planning to do that this year, perhaps the suggestions of the Business Goodwill Advisory Council will help you in choosing the right sort of a gift. The council has published a six page folder entitled "Business Gifts at Christmas -Good or Bad?" In this folder the council sets forth seven basic "Keys to Success" in the selection and distribution of business gifts. The rules it lists are:

1) Keep your gifts of modest value relative to the importance of each recipient as an employee, prospect or customer. Extravagant gifts smack of bribery.

2) Choose your gifts individually, considering the tastes of each group of recipients, or preferably, of each individual recipient.

3) Choose only high quality gifts that are useful, durable and dependable.

4) Personalize each gift, if possible, with the recipient's name or initials.

5) Package each gift attractively and securely.

### Penn Diaphragm

### **GAS VALVES**

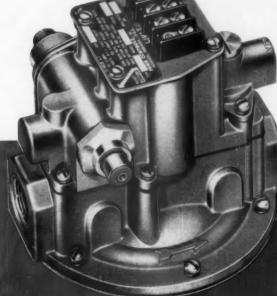
with today's top features!

Here's a line of compact, sturdy gas valves unsurpassed by any other brand.

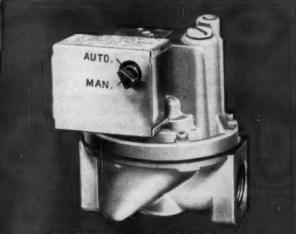
Just look at these most-wanted features...
extra high capacity...quiet, trouble-free
operation...positive acting...speciallymolded, highly-flexible diaphragm assures
accurate valve action and long life in all
gases...and, the line is approved by
all major agencies!

Don't settle for a gas valve "almost as good"...specify and use Penn. And, remember, Penn heating controls deliver the kind of performance that creates bettersatisfied customers. For convincing proof...

Try Penn on your next job!



Series 9000 combination diaphragm gas valve, automatic pilot and regulator. Convenient terminal black eliminates junction box, simplifies and reduces wiring cost. Available in 100% shut-off. Easily converted from L.P. to natural gas. Sizes, ½" small, ½" large and ¾" with or without manual opening and electric reset.



Series 9100 diaphragm gas valve opens immediately to full flow...no click, no hum. Available with manual opening and electric reset. Eight sizes from ½" to 3".

PENN CONTROLS, INC. Goshen, Indiana

EXPORT DIVISION: 27 E. 38th ST., NEW YORK, N.Y.

AUTOMATIC CONTROLS FOR HEATING, REFRIGERATION, AIR CONDITIONING, APPLIANCES, PUMPS, AIR COMPRESSORS, ENGINES

### the editor's notebook

6) Accompany each package with a personal note, greeting card or at least a special gift label.

7) Deliver each gift with a flair, if possible - personally or by special messenger and preferably to each recipient's home rather than to his office.

The council makes strong point of the fact that "as a result of occasional abuses . . . some businessmen have made the mistake of forbidding their employees to accept business remembrances before realizing that such a public statement bares basic mistrust of the employees and inevitably results in very poor employee and public relations."

On the other side, the council points out, detailed surveys have shown that "business giving is generally on the upswing; that the practice is definitely worthwhile, but it does depend on

how it is done."

'The giving of wellchosen remembrances can be a highly rewarding practice,' the survey concludes. "Good will generates easily and it generates best when the remembrance is presented in a truly thoughtful manner as an honest token of appreciation."

#### If You're Applying For a Patent . . .

I NEVER realized what an inventive nation we are until I learned that the United States Patent Office issues about 1000 patents a week, or 52,000 a year. The office has issued more than 2,891,-000 patents since it first opened, according to the National Association of Manufacturers. The number of patents issued is only about 55 percent of the total applied for.



ventional sheaves eliminates power-robbing speed reducers, provides blade speeds of 100, 600 and 3000 fpm. for cutting forgings, bars, stacked bronze, brass, copper, aluminum and steel sheets, plates, stainless, wood and plastics.

Simple, rugged, compact-sealed ball bearings lubricated for life, cemented carbide blade guides. Perfect blade control-no twisting. Frictionless final drive chain-no chatter, no slipping.

Fast, accurate cutting on three-wheel Lockformer Model 24S with 24" throat; two-wheel Model 14SM has 131/2" throat.

More facts? Attachments? You Bet! Just ask . . .

#### OCKFORMER TIME SAVING. MONEY MAKING EQUIPMENT

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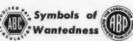
### the editor's notebook

If you have been working on a new device that will aid the industry and are contemplating having it patented, you'll find the comments of U.S. Commissioner of Patents Robert C. Watson to be very interesting. Commissioner Watson's remarks are available from the National Association of Manufacturers. P. O. Box 218. Radio City Station, New York 19, N.Y. There's no cost — just request "Patents and Your Tomorrow."

#### **GAMA Figures May** Help Marketing Plans

It's ALWAYS interesting to study the purchasing habits of the American public. The figures just tabulated by the Gas Appliance Manufacturers Association, Inc., on automatic storage water heaters provide an interesting reflection of what people buy each year.

If a month-by-month breakdown of gas-fired water heaters shipped since 1936 would be helpful to you, you may obtain a copy from Gas Appliance Manufacturers Association, Inc., Marketing and Statistical Dept., 60 E. 42nd St., New York 7.



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REPRESENTATIVES IN PRINCIPAL MIDWESTERN CITIES

### the editor's notebook

#### Confused? Try Writing It Down

NOT LONG AGO, A. Lightfoot Walker, president, Rheem Mfg. Co., stated, "The process of writing things down actually contributes to productivity because it helps precise thinking. Confusions and misunderstandings are cleared up."

#### Where to Turn for Help In Management

HERE'S ANOTHER SBA "rule to manage by":

Small Business Administration Washington, D. C. Dear Mr. Barnes:

Small businessmen should not fumble in the dark for answers to their everyday problems. There are a lot of places they may turn to for help in improving their management efficiency.

The dealer-contractor can appeal, first of all, to certain of his employees. If he encourages them to make suggestions, he may be surprised at the quality and value of

their ideas.

Second, he can look to his sources of supply. Many of them have staffs of engineers. management men and accountants who are highly qualified to be of help on very specific as well as more

general problems.

And then there are his customers. They see his installations at work. They can offer very concrete ideas about good and bad points. Ask them: What could be done to improve performance? How do our products compare with competing ones?

Another place to turn is a state department of commerce or industrial development commission, the Small Business Administration or U. S. Department of Commerce field offices. Take the



### The Line... You've been waiting for





Designed with Yesterday's Experience for Today's Market

STYLED, BUILT and PRICED RIGHT!



Shipped Complete - Ready to Install

\*Patents applied for.

WRITE FOR

Information and name



of nearest distributor

THE JOHNSON FURNACE COMPANY 2129 WEST 117th STREET, CLEVELAND II, OHIO

#### the editor's notebook

Small Business Administration alone. In our 55 field offices, the dealer-contractor can find help on: 1) financial assistance — under certain circumstances, we can make participation and direct loans: 2) procurement assistance - if there are problems of selling to the Federal government, it is possible that we can be of help; 3) production and technical assistance aid on technical and production problems; 4) management assistance - publications, counseling, and administrative management courses.

In recent years, over 500 administrative management courses have been offered by educational institutions located throughout the country. Over 15,000 owners of smaller firms have completed these courses which usually run one night a week for eight weeks, averaging two hours an evening. About 25 men attend each class session. listen to a trained and experienced speaker, and participate in general discussion.

Ideas come from the speakers and resulting discussion. They can be tested out during the week following the session and re-discussed at the next session. This is a good, practical way for a dealercontractor to refresh himself on the best modern methods of running a business.

There are many other sources of information designed to help the small businessman. I'll mention more of them next month.

Sincerely,

Wilford White, Director Office of Management and Research Assistance

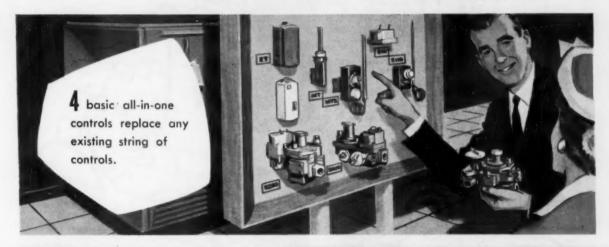
Don't miss Mr. White's letter in this column next month.

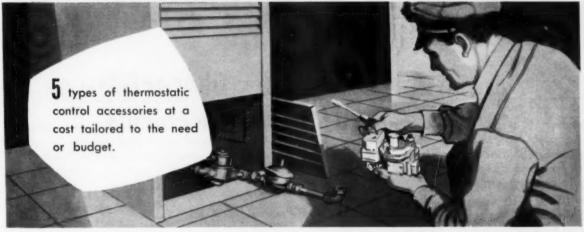
Clyde M. Barner

EDITOR

## AUTOMATIC PROFITS

for dealers in gas heating equipment







### You can sell any customer with A-P's versatile line of controls and accessories

You can sell an A-P comfort control with any new heating unit—a choice of 5 thermostatic accessories offers you the opportunity to fit the accessory to the buyer's needs and budget. Or you can re-

place string type control systems — with a choice of 4 basic A-P controls. Either way you can offer the kind of gas heating every home owner wants — more economical operation . . . more comfort . . .

completely automatic performance.

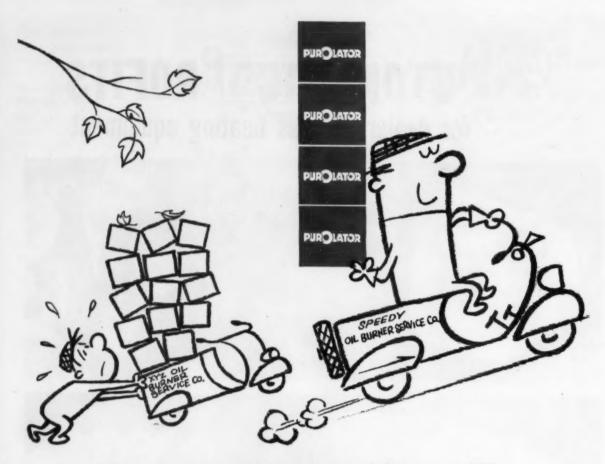
And don't forget that both A-P valves and accessories have the industry's finest service record — performance-backed by thorough inspection and testing techniques.



### CONTROLS COMPANY OF AMERICA

2452 N. 32nd St., Milwaukee 10, Wisconsin
COOKSVILLE, Ontario • Postfach 313, ZUG, Switzerland
Creative Controls for Industry

Want to know more? A-P will give you all the facts on the design, operation and service of A-P gas controls and accessories. Write today for details.



## Carry only 4 Purolator filter refills for 98% of all filter replacements

And now is the time to protect every oil burner with a Purolator filter . . . protect yourself from emergency calls this winter

The fact that 4 Purolator Oil Burner filter refills take care of 98% of your oil burner installations is exactly half the story. There's also this: now is the time to check the filter on every burner you service. Why? Because dirt is being drawn towards the nozzle as furnaces start up these cool nights—and dirt-clogged nozzles account for most of your burner failures. You

stop all dirt particles as small as .0005 of an inch with a Purolator filter. It actually has 5 times the dirt retention and flow capacity of the biggest competitive units. Give them that kind of protection now (it lasts at least a year without servicing) and this winter you'll be free from many of the usual annoying emergency calls.

One more thing: a simple cross ref-

erence chart has been worked out by Purolator that shows you which refills will fit all popular makes of filters. It's yours for the asking—and the coupon below makes it easy to ask, right now.

TO: PUROLATOR PRODUCTS, INC. RAHWAY, N. J.

Please send me your oil burner filter cross reference chart.

Name\_

Title\_

Company\_

Street

Street\_\_\_

City Zan

PRODUCTS, INC.
RAHWAY, NEW JERSEY AND TORONTO, ONTARIO, CANADA

Filtration For Every Known Fluid

What makes

Luxaire\_



easier to sell than to

compete against





UPFLOW: Compact Gas Fired and Oil Fired Winter Air Conditioning Units are completely Assembled and Wired, Heavily Constructed and Smartly Styled. Equally adaptable for the basement, the utility room or alcove.

COUNTERFLOW: Gas fired and Oil Fired Units are completely assembled and wired and have the same compact design, heavy construction and trim styling as the upflow units.







HORIZONTAL: Gas Fired and Oil Fired Furnaces are low and compact for the "light" spaces — a complete line of Gas or Oil.

BASEMENT: Gas Fired and Oil Fired Units. Burn either Gas or Oil with equal efficiency. Handsome Console Cabinet. Assembled and Wired Oil Units.

### With Luxaire—You need not choose between Excellence and a Low Price!

Luxaire gives you the excellence of heavy construction and uncomplicated design in every unit of the complete Luxaire line — with every unit consistently competitive in price!

Whatever you need — Winter Air Conditioning Furnace, Summer Air Conditioning Unit, Gas Unit Heater or Conversion Burner — you can always count on the Luxaire Unit to have deluxe qualities, always at a competitive price!

These twin advantages permit you to command increased profits from replacement or custom-installed jobs — and to compete successfully against cheaply constructed units in price bidding!

And, you are not burdened by a heavy inventory in order to enjoy the favorable price. A nearby Luxaire jobber stands ready to provide speedy delivery on the Luxaire Unit of your choice!

See your Luxaire jobber, today!



2, 3 or 5 H.P.
Air Cooled
CondenserCompressor Unit.
Underwriters'
Listed for Outdoor
Installation.



Upflow Winter Air Conditioning Unit with Circular (Plenum Type) Cooling Coil.



Winter Air
Conditioning
Unit with
Circular
(Plenum Type)
Cooling Coil.



Counterflow Unit with Counterflow Cooling Coil in Accessory Cabinet



Horizontal Furnace with Duct Type Cooling Coil.



Air Handling Blower and Cooling Coil Unit.



Gas Fired Unit Heater



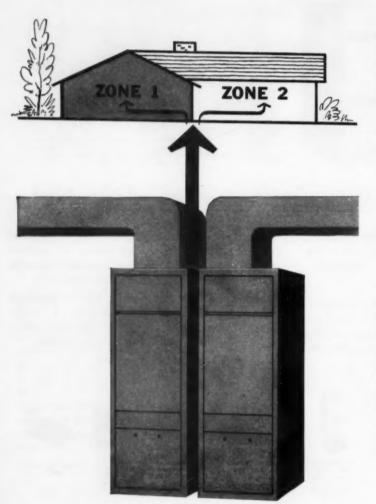
Gas Conversion

THE C. A. OLSEN MANUFACTURING COMPANY . . ELYRIA, OHIO

LUXAIRE HEATING & AIR CONDITIONING UNITS

# NOW...TWO FURNACES

Here's why it'll pay you to promote two furnaces for quality homes!



The profit potential is greater than you may realize! Most of the new finer-quality homes have design features which create heating problems. In larger homes, heating requirements are different for finished basements, rooms over unheated areas, rooms with large picture windows, split levels, spread-out floor plans and in different living and sleeping areas. In fact, surveys indicate that one out of five new houses has a heating problem which comfort-zoning will solve!

### Typical example of two hi-boy furnaces

Now! The combination of comfort zoning and 2 furnaces means the ultimate in comfort for buyers of larger homes! Simply explain how each furnace heats a separate zone, making it possible to fit temperatures to the family's way of living. Installations are usually simpler with less duct work required. The two-zone system costs less to operate. And the good will you create is a real plus! Satisfied customers tell their builders and friends, and you gain customer satisfaction and extra profit!

# FUR UUALIIY HUMES!

Honeywell's national promotion doubles your sales, helps you beat the price squeeze and get the jump on competition

If ever there was a sales natural, this is it! Instead of selling one furnace, you sell two! What's more, we're promoting the idea for you through national consumer and builder advertising. All you need do is tie in. But don't let competition get the jump on you!

Promote "the two-furnace home" now, and beat the price squeeze. Let others shave their profit! You have a new idea to sell! Simply help your builder put the idea across to his customers, and you'll find them cooperating wholeheartedly! This is your opportunity to sell two furnaces instead of one, thus increasing your profit.

Needs differ - advise accordingly

Where zoning is required, recommend the type of zoning that best suits your builders' or home owners' needs. Instead of 2 furnaces, it may be more practical to install 2 zones from one furnace. Or in larger homes you may wish to recommend more than 2 zones.

Be the first in your area to tie-in and make this promotion pay. Call your wholesaler, local Honeywell office or mail the coupon today!

Send now for promotional kit that ties you in with

### Honeywell



First in Control

MINNEAPOLIS-HONEYWELL Department AA-10-114 Minneapolis 8, Minnesota

free kits to help me promote the 2-furnace

Address



MAGNIFICENT

MILCOR

INLAND STEEL PRODUCTS COMPANY

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ATLANTA. BALTIMORE, BUFFALO, CHICAGO, CINCINNATI, CLEVELAND, DALLAS, DENVER, DETROIT, KANSAS CITY, LOS ANGELES, MILWAUKEE, MINNEAPOLIS, NEW ORLEANS, NEW YORK, ST. LOUIS, CR.24.

Member of the ATTAND Steel Family

### Gas Water Heater Shipments Increase

New York City — Manufacturers shipped a total of 1,780,100 gas-fired automatic storage water heaters during the first seven months of this year, according to the Gas Appliance Manufacturers Association. This is a 14.3 percent increase over the number shipped in the same period of 1958, GAMA says.

## Subcontractors Required to Give Notice of Lien

Los Angeles — The mechanics lien bill, SB 814, was recently signed by Governor Edmund G. Brown of California. The new statute requires that a subcontractor or materials man seeking to file a lien must give notice, via registered mail, to the general contractor at least 15 days in advance of filing.

### Electric Heat, Management Sessions Scheduled by NHAW



COMMITTEE ON ARRANGEMENTS meets with Wilbur R. Bull (left), executive director, Northamerican Heating & Airconditioning Wholesalers, to talk over plans for forthcoming convention. In the front row, from left, are Mr. Bull; Wesley Boekemier, Central Furnace Co.; Lee J. Haines, E. E. Souther Iron Co.; Oscar Brauer, Brauer Supply Co.; Joseph Forshaw III, Forshaw of St. Louis; Bill Brauer, Brauer Supply Co.; and George H. Bemarkt, General Pipe & Brass Co. Standing are Ed Kuntz, Ahrens & McCarron; Leonard Troeller, Brauer Supply Co.; Bill Dulle, E. E. Souther Iron Co.; and Ben Kracht, Inland Steel Products, Inc.

COLUMBUS — The 13th annual fall convention of the Northamerican Heating & Airconditioning Wholesalers, scheduled Nov. 29-Dec. 2 at St. Louis, will feature a workshop session on electric heat and several

forums on various aspects of management. Keynote speaker is Dr. Neil Bowman, who will discuss "The Changing Times and the Challenge of the Sixties."

One entire afternoon will be devoted to the session on electric heat, with speakers explaining how this type of heating will affect the future of heating and air conditioning wholesalers. Management sessions will cover:

 Scientific selection of wholesaler personnel.

 Modern management principles, with emphasis on organizational charts, job descriptions, and job evaluations.

 Creating proper employee attitude through the use of effective personnel policies and a good communications program.

4) Work simplification.

5) Training of effective supervisors for wholesalers.

General chairman of the convention is Lee J. Haines, president, E. E. Souther Iron Co. Chairman of the business conference program is Clarence F. Ahrens, president, Ahrens & McCarron.

(More news on page 22)

### Says Electric Utilities Need Warm Air Dealer's Knowledge

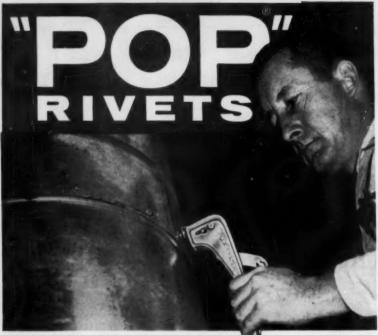
MARSHALLTOWN, IA.—"Electric utilities need the specialized knowledge of the warm air heating dealer-contractor who is an authority on the factors involved in providing overall indoor comfort in homes," according to John W. Norris, president, Lennox Industries Inc.

Mr. Norris pointed out that in promoting electricity as a home fuel, the utilities have furthered construction of the tightly-built, extremely well insulated houses necessary to keep electric heat competitive in cost. "While this type of residential construction reduces fuel cost to the competitive point," he said, "it creates other problems which the warm air heating dealer-contractor,

by his knowledge, can solve. These include: 1) odor persistence; 2) over-humidification; and 3) dirt streaks on surfaces which have been electrostatically charged by gravity air circulation over the electrical conductors in the heating elements."

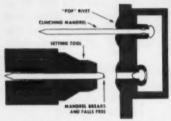
Explaining that such problems can be overcome by warm air heating, which keeps air in motion, Mr. Norris stated: "A well designed forced warm air system, using electric resistance elements for heating the air instead of a gas or oil furnace, will provide heat while keeping the air in motion, thus providing air filtration and making it practical to introduce a small outdoor air duct

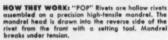
(Continued on page 22)



Install from outside of ducts, blower housings, refrigerator cabinets, showcases, truck or trailer bodies. Get speed, convenience and better appearance at the same time.

- Terrific time saver for fastening ducts, gutters, signs, roofs, vents, and metal enclosures
- Installed and set from the same side







QUICK FASTENING of aluminum downspout with "POP" Rivets. Also fasten butt ends of gutters, eave tubes, end caps, supports, siding, awnings, jalousies, etc.

No other fastener equals the speed and convenience of "POP" Rivets! Sheet metal shops are cutting their fastening time over 50%, and getting a better job at the same time. Low cost setting plier is the only tool needed.

Use "POP" Rivets either in the shop or on the job with the same convenience. Merely drill or pierce a hole, insert the "POP" Rivet and set it from the same side. Perfect for fastening ducts from one side without worrying about fastener stripping or trying to assemble a fastener from 2 sides. Works on sheets as thin as .020 dead soft aluminum without distortion.

Join other sheet metal shops in cutting fastening time. Thousands of users have told us that "POP" Rivets are the

greatest fastener ever developed for saving time, improving quality, and for outright convenience. Call or write us today for sizes, prices and the name of your nearest supplier.

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## Manufacturers Agents

Are you interested in securing additional lines?

We are occasionally asked by our manufacturer advertisers to suggest the names of manufacturers' agents in various sections of the country whom they can contact in regard to representation of their residential and small building heating, air conditioning and sheet metal products.

If you would like your name listed on our records for inquiries we may receive on your territory, we invite you to write us. There is no charge in connection with this service.

### AMERICAN ARTISAN

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US 9-48



Here's another Lau first, designed to help solve those cramped space blower installation problems. The versatile Lau "Electrowheel" is recommended for use whenever air moving efficiency is a requirement but space limitations present a problem. The "Electrowheel" is extremely efficient when operating where the utmost in compactness and smooth, quiet operation is required.

Lau "Electrowheel" features include stationary rub-

ber mounted shaft, sealed ball bearings, rigid one piece motor mounts, 30" motor leads with BX connector and the same high standard of quality found in every Lau engineered product. One moving part assures years of trouble-free service.

When an installation requires a high performance blower the Lau "Electrowheel" is the logical answer. Write for Lau Catalog LSO-463 for complete information.

\*So named because a high quality external-rotor motor forms the wheel hub . .
gives you more air delivery in a small package than ever before possible!

### THE LAU BLOWER COMPANY, 2027 Home Avenue, Dayton 7, Ohio



### NWAHACA Convention to Explore Dealer-Contractor Management Problems

CLEVELAND — Tom Byrd, president of the National Warm Air Heating and Air Conditioning Association, urges all segments of the warm air heating and air conditioning industry to plan on attending the group's forthcoming annual convention to be held at the Chase-Park Plaza Hotels, St. Louis, Dec. 2-4. "I am extending a personal invitation to every manufacturer of heating and cooling equipment, every wholesaler and dealer-contractor in the industry to join in our discussions," Mr. Byrd said.

Convention activity will begin Thursday morning, Dec. 3, with a general session for all convention delegates. The program will include complete coverage of Silver Shield

### Electric Utilities Need Warm Air Man: Norris

(Continued from page 19)

on the return side, through which fresh air may be pumped into the building continuously as a substitute for 'natural air leakage.'

"With such a system, continuous, uniform comfort is provided from floor to ceiling, and from room to room with a single thermostatic control. Individual room zone thermostats are needed only in larger and split level houses.

"Furthermore, a warm air system provides the same operating cost as individual room radiant systems. Even the heat produced by electrical energy going into the motor that drives the air circulating system is usable heat in the warm air system."

Mr. Norris complimented electric utilities for promoting the electrical heating concept. "Electricity," he said, "has already become another fuel for home heating, and the warm air industry must rapidly learn to handle it."

activities. In the afternoon two sessions will be held simultaneously — one dealing with subjects of specific interest to manufacturers, the other aimed at business operations of dealer-contractors. Both sessions will be open to everyone attending the convention — dealer-contractors, wholesalers, manufacturers' representatives and other interested persons. Additional sessions on dealer-contractor management problems will be held in both the morning and afternoon on Friday.

Committees scheduled to meet on Nov. 30, Dec. 1 and 2 include the application engineering council (chairmen of the various manual committees); the research advisory council; system performance committee (manuals 1, 2 and 6); air conditioning load calculation committee (manuals 3 and 11); systems classification committee (manual 8); technical data committee; convection systems committee (manuals 4, 7 and 10), panel and panel-convection committee (manuals 4 and 7A); and the manual 9 committee.

### Business Activity, Incomes Remain At Peak Rates

Washington, D. C. — Business activity continued at a peak rate in the mid-summer period, with consumer and business purchases remaining strong, according to the Office of Business Economics of the Department of Commerce. The rate of industrial operations expanded further, as did employment, except in those areas affected by the steel strike. Personal income was little changed from the high June level, seasonally adjusted, as payroll losses in some industries after mid-July were about offset by income gains elsewhere.

### Oil Heat Testing Film Now Available from OHI

NEW YORK CITY — A new sound color strip is now available from the Oil-Heat Institute of America, Inc. Produced by the Bacharach Industrial Instrument Co., the film covers the testing of oil fired heating equipment by means of combustion test instruments and methods.

### Management Consultants' Association Formed

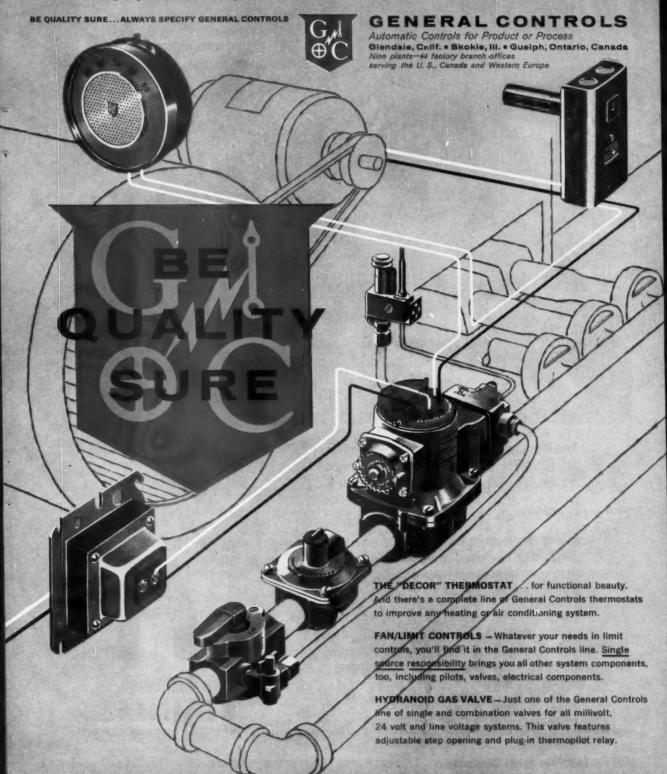
Washington, D. C. — An organization of small business management consultants has been formed to establish channels of cooperation between specialists and small businesses, and to create a better understanding by small business of the functions of consultants. Operating under the name of the Association of Management Consultants, the group has offices at 1223 Connecticut Ave., N. W., Washington, D. C.

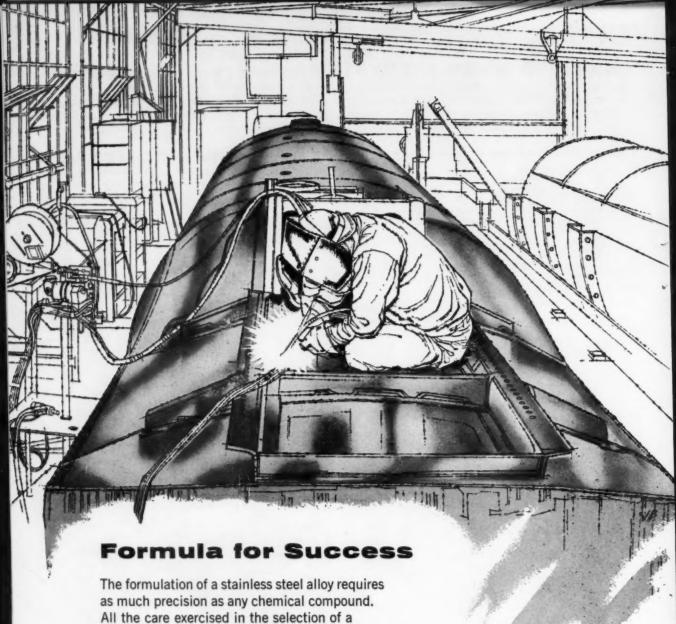
According to George C. Webster, president, the organization hopes to enlist membership among qualified management consultant firms and individuals, and plans to act as a clearing house for management engineers and specialized experts in management so that small firms will be able to obtain management information in various fields from reputable consultants.

Dr. Wilford White, director of the Office of Management and Research Assistance of the Small Business Administration, who has been asked to serve on AMC's board of advisors. said that the SBA wants to "assist in the improvement of management of small business firms by enabling them better to understand and utilize the services of management consulting firms." He said his division of the SBA would assist "in any way proper" toward the formation of an organization of management consultants who customarily have small businesses as clients.

(More news on page 28)

GAS FIRED WARM AIR SYSTEMS – General Controls builds compatible controls for every type of heating system. Single source responsibility for every need, from reliable valves to fashionable room thermostats. Field service by specialists from 44 factory branch offices... stocks in conveniently located warehouses throughout the United States, Canada and Western Europe. Call in your General Controls factory representative today.





particular alloy can be nullified by variations in the analysis specified.

During fabrication, for example, slight differences in chromium-nickel: carbon ratios can cause changes in microstructure which lead to early failure.

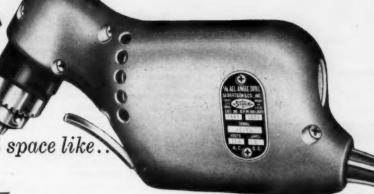
That's why it is safer to specify J&L Consistent Quality Stainless Steel. J&L leads the industry in melt shop standards for stainless steelthe point where quality starts, and longer service life begins.



Plants and Service Centers: Los Angeles . Kenilworth (N. J.) . Youngstown . Louisville (Ohio) . Indianapolis . Detroit Only ONE

Looks like......
Fits the hand like...

Operates in restricted space like.



## SIOUX all-angle drill!



The Sioux All-Angle drill is a complete departure from conventional design. It doesn't look like the others, doesn't operate like the others. It was freshly, and functionally designed to fit the hand naturally, and to work just about anywhere you can get your fist. Because it will work in so many places that conventional drills won't, it is a much more useful tool. Users of drills in every conceivable field have taken to this powerful '4" drill with that special kind of pride,

and satisfaction that men who work with tools can have for good design, and quality manufacture. They have written unsolicited letters about its good "feel;" about how they couldn't stall it even with over sized drills; about how it continued to deliver dependable day in, day out service, years after other nationally known brands purchased at the same time, had been scrapped. This is not just another drill. It's one of the most popular professional drills ever made!



AUTO REPAIR



AIRCRAFT & INDUSTRIAL



SHEET METAL WORK

space. It is immensely useful anywhere screws of any kind are driven or removed. Tightness of screw is determined by hand pressure of operator

in one model, by pre-setting in another.

## SIOUX allangle screwdriver

Built on the same frame as the All-Angle Drill the Sioux All-Angle Screwdriver inherits all the advan-

tages of lightness, power, ease of operation, and ability to work in limited



10

AUTO REPAIR



CONSTRUCTION



ASSEMBLY LINE



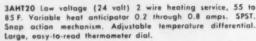
ALBERTSON & CO., INC.

### CHOOSE FROM GENERAL ELECTRIC'S LINE

### **THERMOSTATS**

... your choice of three distinctive, smartly styled new Straight-Line thermostats or the familiar "K" thermostat, all designed around G.E.'s proved, dependable mechanism.





3ACT20 Low voltage (24 volt 2 amp max) cooling service, 55 to 85 F. Same smart design as heating model. Fixed cooling anticipation. SPST. Makes contact on temperature rise.



3AAT30 Low voltage {24 volt—2 amp max} heating-cooling thermostat with sub base. Manual or automatic control of fan. Standard SPDT contacts. Variable heat anticipator. 0.2 through 0.8 amps. HEAT-OFF-COOL selector switch. Fixed cooling anticipation.

K1AN200 Law voltage (24 volt) heating service, 55 to 85 F. Variable heat anticipator 0.2 through 0.8 amps. Adjustable lemperature differential. Standard neutral grey cover, aluminum strap with liquid thermometer.

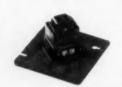


CR7865A101A2 A101B2 A101L2 A101A3 A101B3 A101C2 A101D2 A101C3 A101D3 A101H2 A101H3 A101H3

### OUTDOOR CONTROL SYSTEM







Designed to work with either the new straightline or the K thermostat, this G-E outdoorindoor control system provides an economical means of compensating for loss of heat through outside walls during cold winter weather.

Outdoor thermostat Low voltage (24 volt) reacts to outdoor temperature before winter cold penetrates walls to cause discomfort.

24-volt transformer Provides current for system economically, safely. Installs handily on any standard conduit box.

### MASTER CONTROLS





These General Electric master controls are safety controls, designed to operate the oil burner and help protect the system. Like all G.E. controls, they're easy to service and install. Features: constant or intermittent ignition. Locks out on ignition failure. Recycles on flame failure during normal heat run. Positive safety timing.

Stack-mounting, 90 second lock out
curved flange, welded helix, 115 v, intermittent ignition
curved flange, welded helix, 115 v, continuous ignition
curved flange, welded helix, 115 v, continuous ignition, line voltage
curved flange, welded helix, 230 v, intermittent ignition
curved flange, welded helix, 230 v, continuous ignition
curved flange, bolted helix, 115 v, intermittent ignition, high temp. bimetal
curved flange, bolted helix, 115 v, continuous ignition, high temp. bimetal
curved flange, bolted helix, 230 v, intermittent ignition, high temp, bimetal
curved flange, bolted helix, 230 v, continuous ignition, high temp. bimetal
flat flange, welded helix, 115 v, intermittent ignition
flat flange, welded helix, 115 v, continuous ignition
flot flange, welded helix, 230 v, intermittent ignition
flat flange, welded helix, 230 v, continuous ignition
Remote-mounting, 25 second lock out (for use with 3AHD2 Flame Detector)
intermittent ignition, 115 v

intermittent ignition, 115 v	A105A2
intermittent ignition, 230 v	A105A3
continuous ignition, 115 v	A105B2
continuous ignition, 230 v	A105B3
Remote-mounting, 45 second lock out (for use with 3AHD2 or D4 Flame Detect	or)
intermittent ignition, 115 v	A105E2
intermittent ignition, 230 v	A105F3
continuous ignition, 115 v	A105F2
continuous ignition, 230 v	A105F3

FOR MORE INFORMATION, CALL YOUR G-E HEATING CONTROLS DISTRIBUTOR

Section 740-135, General Electric Company, Schenectady 5, New York

### OF SIMPLE, EASY TO INSTALL CONTROLS



### FLAME DETECTORS

Highly sensitive, accurate detector units designed to give dependable operation and protection with General Electric remote mounted master controls. Features: stack or combustion chamber mounting flexibility. Fast acting quartz rod element. Clutch action provides immediate reaction to temperature change.

Nomenclature 3AHD2A2 3AHD2B2 3AHD2C2 3AHD2D2

3AHD4

Without shield, length 7 1 ½2 inches
Without shield, length 11 1 ½2 inches
Without shield, length 19 1 ½2 inches
With shield, length 7 1 ½2 inches
With shield, length 7 1 ½2 inches
With bimetal actuated flame detector for stack mounting, 6 ½ " insertion

### WARM AIR LIMIT CONTROLS





Available in limit only or fan and limit models. These sturdy controls regulate forced-circulation warm air systems, and protect the furnace from overheating.

Nomenclature CR2992-B111A2

> B111A3 B110A2

Opens on temperature rise (150 F to 350 F) adjustable limit
Opens on temperature rise (300 F to 700 F) adjustable limit
Fan and limit with summer switch.
Adjustable fan, adjustable limit, and adjustable fan differential.

#### STEAM PRESSURE CONTROLS



Dependable "direct-acting" limit control that prevents pressure from going too high in a domestic steam system, and maintains a certain pressure in the boiler until the thermostat is "satisfied".

omenclature
R2927-E108A2
E108A3
E108A4
E108B2
E108B3
E108B4
E108D2
E108D3
E108D4

Non-adjustable, normally closed, male fitting Non-adjustable, normally closed, female fitting Non-adjustable, normally closed, compression fitting Adjustable, normally open, male fitting Adjustable, normally open, female fitting Adjustable, normally closed, male fitting Adjustable, normally closed, female fitting Adjustable, normally closed, female fitting Adjustable, normally closed, female fitting Adjustable, normally closed, compression fitting

### HOT WATER LIMIT CONTROLS



These controls are sensitive to changes in water temperature, and are generally installed directly into the boiler to provide dependable temperature control and system protection. Adjustable 70 through 250 F.

Nomenclature
CR2992-B109A2
B109F2
B109E2
B109J2
B109D2
B109H2

SPST—normal acting open on temperature rise SPST—fast acting open on temperature rise

SPST-fast acting closes on temperature rise

SPDT—normal acting open on temperature rise or closes on temperature rise

SPDT—fast acting open on temperature rise or closes on temperature rise

SPST—normal acting closes on temperature rise

#### TRANSFORMER RELAYS



Here's a combination transformer and relay that operates circulator, blower or fan motors, and burner motors. In addition they can be wired to control a low voltage circuit.

Nomenclature

CR7865-C10082 With enclosure, primary 115 volt, 50/60 cycle C10083 With enclosure, primary 230 volt, 50/60 cycle C10084 With enclosure, primary 115 volt, 25 cycle C10085 With enclosure, primary 230 volt, 25 cycle

### FAN AND LIMIT SWITCHES

This new G-E control is now being incorporated in the system of many furnace manufacturers. Be sure you replace the AHL5 in any system you service with the exact same model. There's a complete selection of models available to fit any domestic oil or gas furnace, any 24 volt control circuit.



GENERAL ELECTRIC

## AGA Launches National Gas Heat Promotion Program

NEW YORK CITY - The Gas Home Bureau of the American Gas Association has launched a national program to help builders and gas utilities win a larger share of the new home market. While national in scope, the "Blue Star Home Promotion Program" is designed to supplement existing local builder programs and provide minimum standards for areas wishing to set up builder programs. To identify with national "Blue Star" promotion, builders and gas companies must comply with minimum requirements of the program but can upgrade these requirements in any way they choose.

Minimum requirements for tract homes call for the inclusion of AGA approved gas equipment for house heating and water heating and provision for gas air conditioning where possible. All equipment must meet standards of the Gas Home Committee.

In model and display homes, the builder must agree to display as

### Electric Utility Asks Rate Increase

Indianapolis — The Public Service Company of Indiana, Inc. has asked the Indiana Public Service Commission for permission to raise rates by some \$52 million a year.

The increase would apply only to residential and farm customers, the petition said, because their charges are out of line with those of commercial and municipal patrons. A company spokesman for the utility, which serves 69 of Indiana's 92 counties, said that monthly bills would increase about 16.4 percent and that the hike would range from \$1.35 to \$1.50 a customer. (This increase would not apply to residential customers heating with electricity.)

much gas-fired equipment as possible.

Gas companies in all major areas of the United States are planning active participation in the program, AGA reports. The program will be backed by intensive national and local advertising and promotion campaigns. Promotional items available include postage meter slugs, display cards, match books, balloons, decals, site signs for tract and model homes, pennants, brochures, cigarette lighters, badges, bronze discs, etc.

### Building Activity Continues High

Washington, D. C. — The value of new construction put in place in August amounted to \$5.3 billion, according to preliminary estimates of the Bureau of the Census, U.S. Department of Commerce. This is an increase of 1 percent over July. August 1959 was 13 percent over August 1958. The total value of work put in place in the first eight months of 1959 was \$35.7 billion, 15 percent ahead of the same period in 1958.

The physical volume of new construction put in place in the first seven months of 1959 is estimated to be 13 percent above the volume for the corresponding 1958 period.

Outlays for new private construction in August were \$3.6 billion, about the same as in July, following the normal seasonal pattern. In the first eight months of 1959, the total was \$24.8 billion, 16 percent above the same period in 1958.

August 1959 expenditures for new residential construction were 22 percent above the 1958 level, and expenditures for the first eight months of 1959 were 31 percent ahead of the first eight months of 1958.

## Conference Session To Be Highlight At ARI Exposition

WASHINGTON, D. C. - The 11th Exposition of the Air-Conditioning and Refrigeration Industry, scheduled Nov. 2-5 at Atlantic City, will feature a "conference session" on Nov. 3. The conference program will cover both air conditioning and refrigeration, will highlight dramatically the part that applications of the refrigeration cycle play in modern American living. Speakers scheduled to appear include Arthur S. Goldman. market research director of House & Home magazine, who will discuss the market for residential air conditioning and will present suggestions as to how this market may be developed: Joseph Rorick, assistant for planning and construction, International Business Machines Corp., who will speak as the representative of a large industrial user of air conditioning: and H. E. Ziel, an associate of Albert Kahn Associated Architects and Engineers, Inc., a firm which has planned, designed and guided the installation of many commercial air conditioning systems throughout the country. Mr. Ziel will speak on the many factors that must go into the determination of system types for various applications.

Plans for presentation of the Air-Conditioning and Refrigeration Institute's new procedures, plans and policies at the institute's membership meeting on Nov. 1 are being formulated by the executive and planning committees and the board of directors. The changes in procedures, plans and policies, which were outlined to the membership at the annual meeting of ARI in May, were approved in principle at that time, with the understanding that they were to be presented in detail at the Nov. 1 membership meeting, when they were to be voted on finally.

(More news on page 32)



McQuay-Norris spring-loaded soft-seat valves are AGA and UL listed for natural, manufactured, and LP gas. Stainless steel working parts. Aluminum die-cast valve body. Special formula Buna N soft seat. Use McQuay-Norris valves with confidence.



### McQUAY-NORRIS

MANUFACTURING CO.

ELECTRIC PRODUCTS DIVISION, ST. LOUIS 10, MO. 49 years in the manufacture of precision products





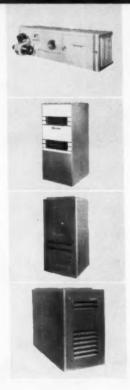
### Coolest Beauties in the Cooling Business!

The Peerless line is bringing full profit back into the heating and air conditioning business for more and more dealers. Complete customer acceptance is the secret. You sell satisfaction instead of price, leaving price and profit cutting to your competition.

With the Peerless line you have the tremendous sales advantage of offering your customers a factory-written and factory-backed LIFETIME GUARANTEE... proof positive that Peerless equipment is built better to last longer!

Working for you is a complete line of products in all price ranges, full-time big-time promotional support and your own new outlook brought about by a new pride in the products you represent.







### Now cut tight curves with line-hugging accuracy

Here's the fast way to slash sheetmetal cutting costs on the job and in the shop: The new Model 200 MILWAUKEE Shear cuts any shape, faster, easier, and with far more accuracy than was ever before possible.

With new blade design you can cut a tight radius either right or left . . . smoothly . . . easily . . . without jamming. You'll like the smooth, powerful and precise way the shear blade slices through sheet metal . . . even Monel and stainless steel up to 17

gauge — without fouling or forcing.

Work edges are smoothly finished right along the cutting line, without further trimming or deburring. A quick twist of the adjusting screw positions the blade and you're ready to cut any metal thickness up to 16 gauge... even heavier on trim cuts and aluminum. Even after hours of cutting, the tool remains cool.

See this completely new shear at your nearest MILWAUKEE Distributor, or write for bulletin SH-1.



MILWAUKEE ELECTRIC TOOL CORP.
5352 WEST STATE STREET . MILWAUKEE, WISCONSIN



Look under -"Tools - Electric"

## Ohio Dealer-Contractors Propose State Licensing Law

TOLEDO - The Ohio Sheet Metal Contractors' Association has formed a committee headed by Robert L. Butler to investigate the matter of state licensing of heating dealer-contractors and to study the procedures used by dealer-contractors in other states in securing state licensing laws. The major objectives behind a program to obtain such legislation, the association states, are to protect the public against irresponsible operators and to elevate the standards of the industry, which in turn will benefit every legitimate dealer-contractor. There are many problems existing in the field today which a properly written state law would overcome, the association says. These problems include:

1) Part time contractors are working in the fringe areas of the larger cities where most of the construction is going on. These men work all day at regular jobs, then install heating equipment in the evenings and on weekends at minimum prices.

2) Lack of knowledge and the lack of a desire to install a properly designed system by many full time operators is resulting in a lowering of the standards of the industry and growing dissatisfaction on the part of the public with warm air heating.

3) Small cities growing up around large metropolitan centers have individual building codes. Thus a big city dealer-contractor must obtain a license (if required) in each of these cities and must follow the whims of various building inspectors.

The association points out that a good state licensing law would meet these problems by: 1) requiring an examination covering all phases of the business — design, installation, sales and service; 2) stipulating that jobs be designed in accordance with established industry standards; and 3) standardizing the heating code on a statewide basis, thus eliminating the license requirements of the many small municipalities in the state.

### California Colleges Offer Heating Courses

Los Angeles — Four southern California colleges are now offering courses in heating and air conditioning, according to the Institute of Heating and Air Conditioning Industries. All are evening courses.

INTRODUCING...

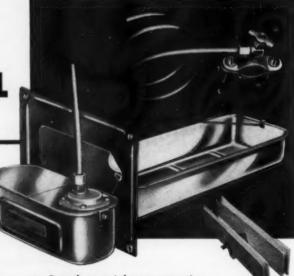
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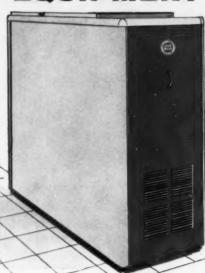
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# ARTISAN

Special report on-

# ELECTRIC HOME HEATING

- Where Does It Stand Now?
- Where Is It Going?
- · Why Is It Sold?
- · How Is It Sold?
- . "Lick 'Em or Join 'Em"?

# electric home heating

# What's It Mean to You?

ELECTRIC HOME HEATING is one of today's most talked-about subjects in both the heating and electrical industries. Estimates of the number of existing installations vary rather widely, as do predictions about the possible share of the future total heating market. Opinion on its advantages and disadvantages is sharply divided, depending a great deal on who is talking at the moment.

# Why This Report?

The purpose of this special report to American Artisan's subscribers is to examine the place of electric heating in the present — and the potential — home heating market, why electricity is being vigorously promoted as a home heating "fuel," how electric heating is being sold and what competition is developing. The objective is to present information that can help warm air heating dealer-con-

tractors, wholesalers and manufacturers decide whether to get into all forms of the electric heating business — or whether to compete against some applications of it.

### **Lessons To Be Learned**

While some confusion surrounds the subject, several facts are clear. There is no doubt that electric heating has made rapid strides. Neither is there any doubt that an increasing number of electric utilities are vigorously promoting it; nor that the installations being made are in the areas where it is being promoted by electric utilities. The success of the efforts to promote the electric heating idea contains a lesson for dealer-contractors, wholesalers and manufacturers who are interested in increasing the application and sale of any type of home heating equipment.

# **How Homes Are Heated Electrically**

# Most methods require warm air dealer-contractor's skills

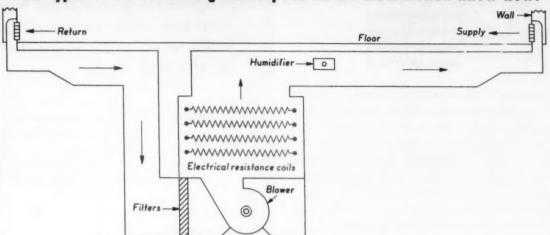
There are several methods of utilizing electricity for heating homes. They include:

- 1) The electric resistance furnace, similar in most ways to conventionally-fired warm air heating installation with ducts and filters, and adaptable to the addition of central summer air conditioning and controlled wintertime humidification but with electric resistance elements in the furnace instead of a gas, oil, or coal burner.
- 2) Electric resistance heating elements inserted in ducts. This type of installation is also easily adaptable to air circulation, air cleaning, central summer air conditioning and controlled

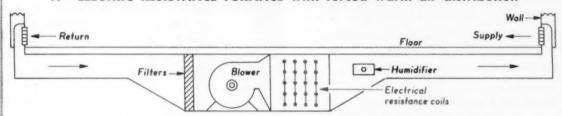
dehumidification, and controlled winter humidification.

- 3) Warm air baseboard diffusers, within which are electric resistance heating elements. Mechanically circulated air which may be cleaned, cooled in summer, dehumidified, humidified, etc. is supplied by ducts to these diffusers, warmed, and introduced to the rooms.
- 4) Heat pumps. There are several types of heat pumps and they take heat from several sources: air, water, or earth. They often also use supplementary electric resistance heat. They are used to warm air or water for winter heating. In

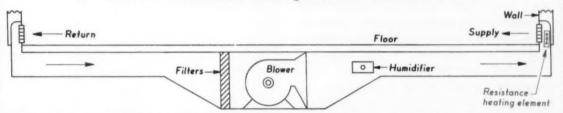
# Four types of electric heating that depend on air distribution know-how:



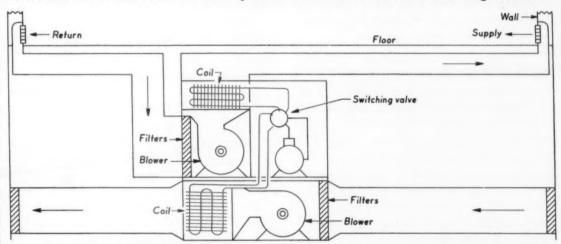
# 1. ELECTRIC RESISTANCE FURNACE with forced warm air distribution



# 2. ELECTRIC RESISTANCE heating elements inserted in ducts



# 3. WARM AIR BASEBOARD diffuser system with electric resistance heating elements



4. AIR-TO-AIR HEAT PUMP for heating and summer air conditioning



summer, the same equipment is used for cooling.

5) Direct electric resistance heating units or panels located in the rooms being heated. Such units include various designs of baseboards, wall panels of various types and construction, heating cable buried in the ceiling, etc. With some of these methods, part of the heat supplied the room is radiant energy. Generally, no air circulation other than that obtained by natural convection is provided; and as there are no ducts, any desired summer air conditioning, air cleaning, ventilation air supply, or controlled humidification or dehumidification must be furnished separately, and sometimes may not be economically feasible for the homeowner.

# **Need Air Handling Know-How**

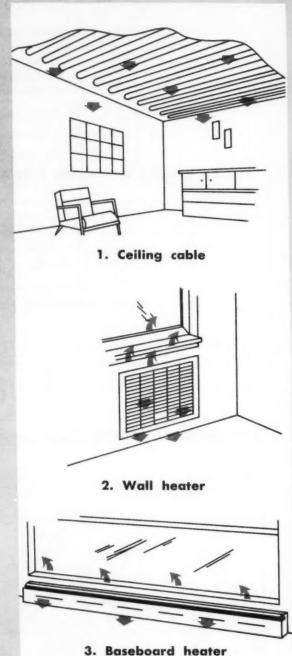
All these methods of electric home heating except No. 5 depend on the air handling know-how and the duct design, fabrication and installation skills of the experienced warm air heating-residential air conditioning dealer-contractor.

However, most discussions of electric home heating usually refer to the direct room-located electric resistance units of one kind or another. It is also this type of equipment which is most commonly going into homes and apartments largely as the result of the current heavy promotion programs of the utility companies.

# **Spotlight Direct Resistance Heating**

For these reasons, most of the following report is confined to this method of application, and any further reference here to "electric heat" will apply to the direct electric resistance type of equipment listed in paragraph No. 5 above (unless specifically stated otherwise) and not electric furnaces, electric duct heaters, warm air electric baseboard diffusers, or heat pumps.

It should also be remembered that this report pertains primarily to heating single-family homes, and not to commercial or industrial buildings (again unless specifically stated otherwise). DIRECT ELECTRIC RESISTANCE HEATING arrangements produce most of their heating effect from radiant surfaces (straight arrows), achieve very little air circulation (curved arrows)



# Where Does Electric Heat Stand Today?

# Surveys locate the "strongholds"

Several different sources have reported statistics on or estimates of the number of electric heat installations currently in service in the United States, or in specific areas. While the different figures don't always agree too well, they are summarized here to give a picture of what these various sources believe the present size of the market to be.

A leading association of manufacturers of electrical equipment, for example, estimates that presently there are approximately 600,000 "completely electric resistance heated homes" in the U.S. This number is equivalent to 1½ percent of the nearly 48 million residential electric customers in the U.S. To indicate the growth of this heating method, this same source gives the following number of installations in service (not annual sales) for the past several years:

Year		Number of Installations in Use	
		87,000	
1951		98,000	
1952		115,000	
1953		140,000	
1954		180,000	
1955	***************************************	240,000	
1956		310,000	
1957		390,000	
1958		490,000	
1959		600,000	

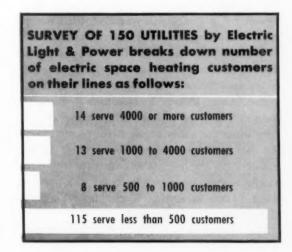
Another source, the official publication of the National Electrical Contractors Association, has reported totals for the number of electric heat installations in service as of March 31 this year that do not appear to agree too well with the estimates above. According to the NECA — to whom 39 utilities serving areas with a total population of 65,704,522 reported — there were 83,880 electric heat installations in service in residential, industrial, and commercial buildings in these areas at the end of this year's first quarter. (Of these installations, 9480 were heat pumps and the balance resistance heat "of all types," the heat

pump jobs representing 135,841 kilowatts and the resistance installations 849,233 kilowatts).

Despite the fact that the NECA survey was made not to conduct a census of installations but only to establish the trend, the 83,880 figure and the earlier 600,000 figure should agree more closely, it would seem, as the smaller one is stated to represent areas having over one-third of the total U.S. population. Also, it is believed that the group of 39 utilities whose reports are combined to make up the 83,880 figure represent those that are most actively promoting electric heating. The 39 companies are representative of all parts of the U.S. — low-cost power areas as well as others - and include utilities serving the New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, and Pacific Coast sections.

# TVA Region Is 'Electric Heat Stronghold'

The "electric heating stronghold" continues to be the East South Central states, the association says, where comparatively low cost TVA power is available in many localities. That area has more than 33,000 installations. An "above average" number of installations is also noted in the Pacific Northwest, where there is also much low-cost power, says the NECA. It should be noted, how-





ever, that electric heating is making rapid gains in other than the "low cost power" areas.

## **Electric Utilities Count Their Customers**

According to a study by Electric Light and Power, covering 150 U.S. utility companies which serve a total of 38,443,632 residential customers (over 80 percent of the U.S. total), there were 248,037 electric space heating customers with "built-in" installations at the end of 1958. This number of installations is equivalent to about 2/3 of 1 percent of the total residential customers served by the reporting utilities. Ninety-four of these utilities are now actively promoting electric space heating.

# '58 Heat Pump Sales More than Double

According to data furnished by the utilities surveyed, there were 15,549 residential heat pumps on their lines at the end of 1958. Sales of heat pumps in 1958 were nearly 250 percent of 1957 sales, the study indicates. The survey was made in cooperation with the commercial division of the Edison Electric Institute.

# **Look at Specific Areas**

Turning from national estimates of the number of installations in use, let's look at some figures for a few specific areas of the country.

The American Electric Power system operates in parts of Virginia, West Virginia, Kentucky, Tennessee, Ohio, Indiana, and Michigan, and serves approximately 1½ million residential customers. About 1500 of its customers — many of them in Tennessee — heated their homes electrically when the utility began active promotion of this use of its product in January 1954. At the end of 1958, the number of customers with electrically heated homes had increased to a total of about 14,000 in service. These figures include heat pumps and other methods.

The Commonwealth Edison Co. and its sub-

# ESTIMATES VARY OF HOW MANY INSTALLATIONS THERE ARE

estimates of existing installations vary in purpose and in results. Extrapolations of regional and fragmentary reports establish little agreement with "total U.S." estimates—indicating advisability of caution in accepting published estimates of total electric heat market.

## National

Electric manufacturers' group estimates approximately 600,000 "completely electric resistance heated homes" in U.S. today.

Electrical contractors' association reports 83,880 electric heat installations in service in residential, industrial and commercial buildings (9480 heat pumps, 74,400 electric heat installations "of all types") in sample areas representing over one-third of the total U.S. population.

An electrical trade publication, in a survey covering 150 utilities serving over 80 percent of the total residential customers, lists 248,037 electric space heating customers with "built-in installations" (including 15,549 heat pumps) in 1958.

# Regional

Utility serving parts of Virginia, West Virginia, Kentucky, Tennessee, Ohio, Indiana and Michigan estimates 14,000 electrically heated homes (all types) in service at the end of 1958.

The utility serving the Chicago and northern Illinois area, tracing results of strong promotion, tallies 3075 "electrically heated dwelling units" (About evenly divided between single family homes and apartments) at the end of the first half of 1959.

sidiary were serving a total of 140 electrically heated "dwelling units" (houses and apartments) in the Chicago and northern Illinois area at the end of 1957. A vigorous promotional campaign was launched last year, involving large-space newspaper advertising, television and radio commercials, special showroom and window displays, discussions with builders and architects, etc., and a promotional rate of 1.75 cents per kilowatt-hour for electricity used for space heating homes in which no other method of heating is used.

# **Promotion Brings Impressive Results**

As a result, 1260 more installations were added to the lines during 1958 to make the total in use at year's end 1400. During the first six months of this year, the number of installations in use more than doubled, with 1675 being added to bring the total

to 3075 jobs. About half are believed to be in single-family homes and half in apartments.

The question of what percentage of the total home heating market the various figures quoted above represent is not only complicated by the lack of agreement in the various estimates, but also by the distinction between the terms "dwelling units" (which include apartments and single-family houses) and "homes."

## **Growth Is Factor to Watch**

But the actual number of electrically heated homes now in existence may not be the important point. Probably more important is the growth of this method of heating in areas where the utilities are promoting the idea — and where other utilities will promote it in the future. So let's turn to some predictions.

# **Predictors See Substantial Growth**



If estimates of the number of electric heat installations now in use seem confusing, predictions for the future quite naturally are even more so.

John G. Snyder, manager of the residential-commercial sales division of American Electric Power Service Corp., said in his talk at the American Power Conference earlier this year that AEP expects to be serving about 2 million residential customers by 1975, and has "set its sights at 25 percent saturation of electric heating customers" at that time, he said. This would mean AEP would serve 500,000 electrically heated homes.

# **Goal Calls for Conversions to Electricity**

This figure includes both resistance heating and heat pumps, and anticipates increased popularity of the heat pump, with a higher percentage of electrically heated homes in the future using this method. If this goal is to be reached, a sizable ... tempered by several "ifs"

number of customers will have to be converted "from combustion heating to electric heating equipment," he said, as "there just won't be enough new homes built" in the area to account for the 25 percent saturation at which AEP is aiming. He mentioned that approximately 20 percent of the 14,000 homes now electrically heated on the AEP system have been converted from another fuel.

In referring to electric heating, AEP includes all methods, is convinced that a substantial part of future growth will come from heat pumps and other air circulating methods — and "perhaps from methods not now in existence."

# See Big Strides for Electric Heat

In informal remarks at the same session, Ole Hill of Commonwealth Edison, Chicago, predicted that 1¾ million homes in the United States will be electrically heated by 1965.

In a talk before the National Electrical Contractors Association last fall, M. H. Wessel, sales



manager of the electric heating division of the Cavalier Corp., estimated that 1 million electrically heated homes will be in existence by 1960, and 3 million by 1970. This would call for an average of 200,000 installations annually during the 1960-1970 decade.

Based on projection of the installations made to date on Commonwealth Edison's lines, an estimated 400,000 electrical heat installations might be in service in dwelling units in 1975, which would represent some 15 to 20 percent of all dwelling units in the area served.

A forecast quoted by Paul W. Emler, vice president of American Electric Power Service Corp., in his address at the Edison Electric Institute's sales conference, "based on information given by 128 utility companies," places the estimated total number of electrically heated homes in the U.S.

at 708,000 in 1960 and 1,750,000 in 1965. He proposed that an objective of 25 percent saturation of electric heating customers at the end of the next 20 years be set. There should be 75 million residential electric customers in the U.S. in 1979, "and 20 million of them can be electric heating customers," he said. "We can have as many as six million of them at the end of 10 years," he stated.

# **Depend on Growth in Heat Pump Sales**

A substantial part of this objective involves heat pumps, based on the assumption that summer air conditioning will have wide acceptance in the coming years and that improved equipment will be available at lower cost, he said.

The electric house heating division of a national association of manufacturers of electrical equipment estimates that 150,000 electric resistance heating installations will be made in 1960, will grow annually to a rate of 400,000 installed during 1965, and will continue to increase to an estimated 600,000 installations to be made in 1970.

# PREDICTIONS FOR FUTURE GROWTH OF ELECTRIC HEAT ARE OPTIMISTIC

John G. Snyder, American Electric Power Service Corp.: AEP expects to be serving 2 million residential customers by 1975 and has set its sights at 25 percent saturation of them, or 500,000 electric heating customers at that time. (Estimate includes both resistance heating and heat pumps.)

M. H. Wessel, Cavalier Corp.: One million electrically heated homes will be in existence by 1960, and 3 million by 1970. This would mean an average of 200,000 installations annually during the 1960-70 decade.

Ole Hill, Commonwealth Edison Co.: One and three-quarters million homes in the United States will be electrically heated by 1965. Paul W. Emler, American Electric Power Service Corp.: Information given by 128 utility companies places the estimated total number of electrically heated homes in the U.S. at 708,000 in 1960 and 1,750,000 in 1965. There can be 20 million electric heating customers in 1979.

A national association of manufacturers of electrical equipment: About 150,000 electric resistance heating jobs will be installed in 1960; will grow annually to a rate of 400,000 installed during 1965, and will continue to grow to an estimated 600,000 installations during 1970.

# ... But What's

# Really

# the Potential?

 Many factors influence early forecasts of growth

It is obviously impossible to peer with any great accuracy several years hence. The estimates of 20 or 25 percent of the total heating market that have been mentioned seem to be the highest predictions that have been made. But predictions about the future development of any idea, equipment or product that is being promoted are naturally and notoriously optimistic (with some exceptions, of course) when the "promoter" makes the prediction.

Such predictions usually are also much influenced by early successes. A certain portion of any market is made up of people who are willing to buy the "new" and the "modern" just because it is new and modern. This factor must be considered when evaluating the future market, for many of those that buy at first are not representative of those who must be sold later, and at some point, the "new" is of course no longer new or modern.

Another influencing factor is whether or not the

These factors must be weighed in judging predictions of the growth of electric heating:

- 1. The promoters' natural enthusiasm for the idea.
- 2. Early successes in a program promoting "new" and "modern" ideas which eventually are no longer new.
- 3. Ability of the promoters to maintain the vigorous efforts expended early in the campaign.
- 4. Effects of counter-promotions by competitors.
- 5. Possibility that promoters of direct electric resistance heating may later concentrate mainly on the apartment market instead of single family homes, and that applications of this type of heating may be found to be more competitive to "wet" heat and less to warm air heating.

vigor of the early utility promotional efforts will be carried on year after year, and whether electric utility space heating promotion, promotional rates and "subsidies" or allowances of one kind or another offered by some utilities will continue to expand from area to area and company to company. Too, the effects of "counter-promotion" by competitors — the gas utilities particularly, oil heating, "wet heat" manufacturers and contractors, the warm air heating industry, etc. - must not be disregarded. The progress of electric heat to date is bound to lead to such "counter-promotions," and this is evidenced by the several "electric heat committees" already appointed - though not necessarily already functioning — by various associations and other groups.

## **Heat Pump Fits Promotion Plans**

More of the electric utilities (as some do now) may switch their promotional efforts to the year



round heat pump type of installation, as such equipment continues to develop. This type of electric heating equipment cuts the amount of power for heating in winter radically, uses electricity for cooling in summer, requires power the year around for air circulation, and fits in beautifully with electric utility promotion programs on air conditioning, whereas straight electric resistance heat does not. On the other hand, separate electric heating and cooling systems in the same house may operate at better load factors than heat pumps.

The electric furnace, duct electric heaters, and warm air electric baseboard systems may also enjoy more utility promotion in the future, as their advantages over the room-located electric resistance heating units become more widely appreciated.

And it may well be that straight electric resistance heating will prove more highly competitive in the apartment applications than the singlefamily home market (because it has additional advantages in that type of application), and to hot water and steam heating more than it will to warm air heating.

# **Are Predictions Too Optimistic?**

It's probably pretty safe to say, then, that the estimates which see electric heat representing 20 or 25 percent of the total market some years hence should be scaled down considerably — especially when we are talking about the effect of electric heat on the residential warm air heating market.

But again, the actual percentage picked as the estimate is not the important point to the dealer-contractors, wholesalers and manufacturers whose livelihoods depend on the residential heating market. What is important is that electric heat is making rapid strides, undoubtedly will continue to make strides at some rate in the future, and that it is making and will continue to make its progress at the expense (to some degree) of other methods of heating.

# Why the Utilities Promote

... to sell

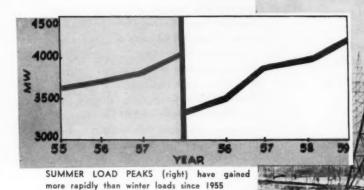
Utilities spend time, money, and effort to promote the use of electric space heating in order to increase the sale of electricity. And they establish special rates for electricity used for space heating to bring the operating cost more closely in line with the cost of other fuels, and to keep their equipment busy during off-peak periods. These are logical, straightforward reasons, and they are the principal reasons.

What the home heating load can mean to the sale of electricity was concisely summarized by Paul W. Emler, vice president of the American Electric Power Service Corp., at this year's Edison Electric Institute sales conference. He said:

"Our residential load can continue to grow

from more customers due to population growth, and from the sale of the more accepted appliances. But this growth is limited. Even if it were possible for us to reach a saturation figure of 100 percent for electric ranges, water heaters and clothes dryers, our average use would probably not exceed 7000 or 8000 kwhr per year. Consider also that as the years roll by and saturations on appliances build up, it becomes harder to push the saturations higher and still higher. Replacement sales take their toll. Not that we don't want replacement sales, but they don't add revenue — they just keep what we already have. In our service area it takes almost two range sales to get a new range customer and three water heater sales to get

Electric heating is the utilities' answer to the problem of building up winter loads to balance summertime peaks



HEAVY-DUTY TRANSMISSION LINES and substations, built to handle summer air conditioning loads, have plenty of excess capacity to handle bigger wintertime electric heating loads

# **Electric Heat**

more power, balance loads

two new water heater customers. This is our problem if we try to reach even the 7000 or 8000 kwhr goal through major appliance sales.

"On the other hand, we can — if we promote and sell electric heating — set our sights on an average use of 10,000 kwhr per year per customer as a relatively immediate goal and can put 20,000 kwhr per year on the horizon as a measure of near perfection."

#### Seek to Balance Loads

But other factors are also involved in the utility interest in electric heat. One of the commonly mentioned ones is the increasing number of utility companies that are experiencing — or expect soon to do so — summer peak loads on their systems due to increased use of electrical power for air conditioning. Thus, it becomes desirable to build up winter usage of electricity — and it is feasible to do so by offering a lower promotional rate to attract more customers.

### **Prefer Near-Unity Power Factor**

Smoothing out the daily (24 hr) demand for electricity is also an important consideration to the utility, and the maximum heating demand does not usually occur at the same time of day that power system demands now occur. Also, the near-unity power factor of resistance heating load costs somewhat less to serve than do loads with lower power factors.

Space heating thus seems to be a perfect application — at least from the utility's standpoint —



to increase consumption of electricity during the winter months.

# **All-Electric Home Defies Competition**

Another important factor is the industry promotion of the all-electric home. The all-electric home gives speculative and project builders something to advertise as "modern" and "up-to-date" — and in many areas, the builder is helped to do so by the utility company in one way or another. Equally important to the utility is that, if a home is all-electric and perhaps doesn't even have a chimney, the electrical appliance load — water heating, cooking, clothes drying, refrigeration — is "protected" against the use of gas for heating or air conditioning.

# THESE UTILITIES HAVE PROMOTION MATERIAL

American Electric Power Service Corp. Appalachian Electric Power Co. Indiana & Michigan Electric Co. Kanawha Valley Power Co. Kentucky Power Co. Kingsport Utilities, Inc. Ohio Power Co. Seneca Light & Power Co. Wheeling Electric Co. Arkansas Power & Light Co. Atlantic City Electric Co. The Cleveland Electric Illuminating Co. Commonwealth Edison Co. Consumers Power Co. The Detroit Edison Co. **Duquesne Light Co.** Florida Power Corp. The Hartford Electric Light Co. Houston Lighting & Power Co. Illinois Power Co.

# What Are Sales Appeals of Electric Heat?

Utilities pile up "advantages"

What are the sales appeals used for this method of heating, especially when it is generally admitted even by the electric utilities that operating energy costs will be higher — in some cases, considerably higher — than with gas, oil, or coal?

The relative importance of the various sales arguments will vary according to the prospect. For example, a low cost of installation with a higher operating cost would be expected to appeal more to a speculative or project builder, or to the owner of an apartment whose tenants will pay for the heating, than it would to a homeowner who expects to live with the system for years.

## Sell 'Modern' Idea

Perhaps the principal sales point used for electric heat is that it is "modern" and represents "the newest development" in heating. As mentioned, this gives the speculative or project builder something to sell, ties in with all-electric home promotions, is a point that can be used by the apartment building owner in seeking tenants, and is a winning argument with many homeowners. "Modern" is one of those terms which is applied and accepted as an advantage, as is the "prestige" accorded the owner of "the latest thing."

## Extol Space, Safety, Upkeep Features

Another important sales point is that an electric heating installation of the direct resistance type we are discussing here requires no space for a furnace (or boiler), chimney, fuel storage, or ducts (or piping). The smaller the house or the apartment unit, the more important is this point.

# PREPARED THEIR OWN ON ELECTRIC HEATING

Indianapolis Power & Light Co. Kansas Gas & Electric Co. Metropolitan Edison Co. **New England Electric System** Ohio Edison Co. Oklahoma Gas & Electric Co. Pennsylvania Electric Co. Philadelphia Electric Co. Potomac Edison Co. Potomac Electric Power Co. Public Service Co. of Indiana, Inc. Tampa Electric Co. Texas Electric Service Co. Union Electric Co. Utah Power & Light Co. Virginia Electric Power Co. Washington Water Power Co. Western Colorado Power Co. Western Massachusetts Electric Co. Wisconsin Power & Light Co.

The safety and dependability of electric heat, while not always featured, is generally brought up. "No combustion," "no flames," "as dependable as the electric light," "the furnace won't get out of order when your wife is home alone" — are all used as sales points.

Simplified maintenance is stressed, with no "burners or chimney to need replacement or cleaning." And the fact that "there are no dirty air filters to change" is often played up.

# **Competition Questions Sales Points**

Other sales points brought out to promote electric heating include: 1) the ease of control and flexibility, with "a thermostat in each room to provide the temperature desired in each room quickly," (promoting economy and the ability to avoid overheating due to sun effect, unusual internal heat sources, etc., affecting individual rooms; 2) that electric heat is clean and quiet; and 3) that all of the heat paid for goes into the space and "none goes up the flue." (Competitors have pointed out that the latter argument may be

meaningless if the 100 percent of the heat that goes into the space costs more than the heat generated by a combustion fuel, even though it is true that some part of that heat may "go up the flue.")

Also questioned by competition is the feasibility of maintaining — under ordinary living conditions, with doors open, etc. — individual room temperatures, with sufficiently lower temperatures in some rooms to produce any measurable heating economy. On the other hand, electric utility engineers have said that such individual room temperature control can effect an 11 percent saving in the cost of electricity for space heating. The amount of any such saving would, of course, depend on the particular house, its size, room arrangement, etc. (The 11 percent figure was given as a rough overall "average" estimate.)

# Itemizes 'Other' Cost-Saving Features

A summary of what at least one builder of houses "likes about electrical heating" has been presented by Jack R. Worthman, vice president of John R. Worthman, Inc., Fort Wayne, Ind., a city that has enjoyed heavy utility promotion of electric heat. He made his presentation at an Edison Electric Institute meeting.

According to Mr. Worthman, electric heat saves about 15 sq ft of floor space in a house, representing some \$200. It also saves a chimney cost of \$100. Planning is more flexible, he said, because locations of furnace, chimney, registers and ducts need not be considered. "Better heat with better control" is an additional sales point the builder can offer his customers, he stated. In most cases, electric heat eliminates one subcontractor, he pointed out, as the electrician can do both the heating and the wiring, and "it eliminates one utility bill, one meter reader, or one oil tank." Other savings he mentioned are "\$30 for a furnace room door, \$20 for soundproofing the furnace room, \$100 for slab ducts, \$125 for a buried oil tank, and usually \$200 by giving the heating and wiring contracts to the same contractor."

He said installation costs for straight resistance electrical heat are comparable to a warm air system and generally less than for a hot water heating plant. Additional costs for an electric heat installation include, he stated, about \$80 more for ceilings, \$65 for more insulation, and \$160 for storm windows.



# **Operating Cost Poses Sales Problem**

electric home heating

# THESE UTILITIES OFFER LOWER RESIDENTIAL RATES FOR ELECTRIC HEATING

Alabama Power Co. Arkansas Power & Light Co. Atlantic City Electric Co. **Austin Electric Department** Carolina Power & Light Co. Central Illinois Public Service Co. The Cleveland Electric Illuminating Co. Colorado Central Power Co. Commonwealth Edison Co. The Connecticut Light & Power Co. **Duke Power Co.** Duquesne Light Co. Gulf States Utilities Co. Illinois Power Co. Indianapolis Power & Light Co. Iowa Power & Light Co. Jersey Central Power & Light Co. Kansas City Power & Light Co. Kansas Gas & Electric Co. The Kansas Power & Light Co. Louisiana Power & Light Co. Metropolitan Edison Co. Mississippi Power & Light Co. Minnesota Power & Light Co. New Jersey Power & Light Co. Northern States Power Co. Oklahoma Gas & Electric Co. Otter Tail Power Co. Pennsylvania Electric Co. Public Service Co. of Oklahoma Public Service Co. of Indiana Inc. Texas Power & Light Co. Union Electric Co. West Penn Power Co. Western Massaschusetts Electric Co.

# How "promoters" use cost data

Although Mr. Worthman said the installation cost of an electric heat system is comparable to a warm air job, it seems to be widely held that first cost of electric heat is less than that for more conventional types of installations, even including the cost of providing the 6 inches of insulation in the roof, 4 inches in the walls, and 2 inches in the floor, and the storm windows, which most electric utilities and installers recommend. The big cost question then becomes the expense of operation.

Some few areas of the country of course have very low electric rates, where electricity can compete — or can come close to competing — with "combustion fuels" on a straight cents per Btu basis. In most places, however (including areas where electric heat is being vigorously promoted), electric heating rates are admittedly not competitive on a straight theoretical cost basis with gas, oil, or coal.

# Weigh Advantages vs Cost

One electric utility engineer roughly estimated that for a typical house now being heated with gas, the cost of electricity for heating (at a 1.75¢ per kwhr rate) would be two-and-a-half times the gas cost. However, were the house to be insulated — as his company would recommend if it were converted to electric heat — he said the electric cost would be 1.7 times the gas cost. Why then convert to electric heat? His answer embraced the advantages of electric heat, as summarized above — modern, clean, individual room control, etc. "You cook electrically, you heat water electrically," he said. "Why not heat your house electrically?"

# Study Value of 'Efficiency' Factor

To bring electric heat operating costs more in line with the other fuels, credit is taken for heat gains from occupants, lights, etc. This latter point can lead to use of a factor that might make one think an electric heat system can operate at more than 100 percent efficiency. The electric heat people's answer to this is that the seasonal efficiencies for gas, oil, and coal given in the standard handbooks are not truly efficiencies in that they also include credits for heat gains from occupants, lights, etc. It has thus been suggested that such factors not be called "efficiency" but that the term "seasonal performance factor" be used instead.

In a competitive brochure for public distribution, The Peoples Gas Light and Coke Co., Chicago, states that "the following figures are typical costs of electric heating vs. conventional gas installations in an average three-bedroom house with 1000 to 1100 sq ft of floor area and a full basement." The figures include equipment and distribution system.

Type of Equipment	Installed Cost		
Electric heat pump (combination heating and air conditioning)		.\$2.	,050
Electric resistance (baseboard)			895
Gas hot water boiler			910
Gas forced warm air			610

The electric heat pump system includes air conditioning, the gas utility notes, acknowledging, however, that add-on air conditioning units can be utilized with the gas heating systems and "the combined cost will be considerably less than for the heat pump system.

# **Insulation Boosts Installation Costs**

"The high cost of electrical energy definitely requires the use of extensive insulation (6 in. in the ceiling, 4 in. in the walls and 2 in. in the floors). The use of double glass is also of primary importance in reducing heat loss. Both of these items add to the initial cost of installation," says this brochure.

While these two items would also benefit the use of gas fuel, "the economical operation of conventional gas-fired equipment does not depend on or necessitate their installation," the utility states.

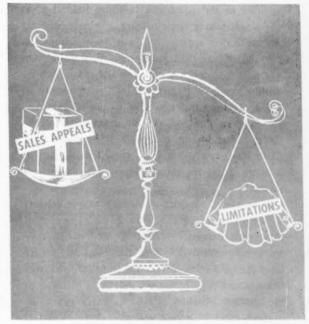
Even more insulation (such as 12 in., 6 in., and 6 in.) for electrically heated homes has been proposed, the determination to be based on the amount that results in the lowest total of yearly electricity bills plus annual mortgage payments.

# Other Objections May Affect Growth

# ... or turn it to different markets

Other than the generally accepted higher cost of operation of an electric heating system, what are some of the objections to this method?

Rarely mentioned, but what appears to be a strong objection to electric heat — at least from the warm air heating industry's viewpoint — is of course the practical difficulty of providing ventilation air, controlled wintertime humidification, air cleaning, air circulation and summer air conditioning. Much of the popularity of warm air heating is attributable to the ease and economy with which air circulation and air cleaning can be supplied the year around, controlled humidification in winter, and controlled dehumidification and air conditioning in summer. These advantages have helped make warm air the major method of heating America's homes.





Thus, to many in the warm air industry, direct electric resistance heat — "just plain heat" — seems a step backward rather than a "modern trend." This point does not apply, of course, to heat pumps, electric furnaces, or warm air electric baseboard methods.

# See Bigger Threat to Wet Heat

And it must be remembered, too, that the electric utility's product — electrical energy — is used for year 'round air circulation and summer air conditioning. It is therefore conceivable that as more experience is gained by homeowners and home builders on what electric heat can and cannot do, what the operating costs are, and if and when utilities slacken off their promotional efforts, electric heat may tend to be more of a competitor to the hot water system than to warm air heating with its many inherent advantages as mentioned above.

# **More Advantages for Apartments**

Too, electric heat may tend to be more competitive in the apartment building field than in the single-family home market, as also mentioned above, for it appears to have more advantages for apartments than for homes. Where the tenant pays his own fuel bill, the size of the bill — within limits — is probably not as important to the apartment owner as it is to the homeowner. In an apartment, too, the monetary value of the space saved by an electric heat installation is more important — or is so regarded — than in a home. So is the money saving in required attendants.

It is also a distinct advantage to the tenants of an apartment building to be able to control their own heating — have it "on" when they want it, particularly. And the building owner likes the idea of each tenant controlling his own heating and paying his own bill, as a solution to the common problem of tenants' extravagant use of heat from a central system.

## What About Moisture, Odor?

Another problem that has come up in some houses is too much uncontrolled moisture from cooking, bathing, laundering, etc., and odors due to lack of ventilation air, in a heavily-insulated, tightly-constructed, electrically heated structure with no chimney. Too much moisture can cause damage as well as discomfort. If ventilation is provided to correct the moisture problem, both first cost and operating cost of the electric heat installation of course go up.

As was indicated before, there is some question as to the economic and practical feasibility of realizing savings by using individual room control with an electric heat system.

# **Compare Costs of Electricity and Gas**

Installation costs of electric heat, and of a radial warm air gas-fired warm system, for a three-bedroom, 1050 sq ft house in downstate Illinois were analyzed for a builder who was interested in an "all-electric" subdivision. With the addition of "full insulation" and storm windows, as required for electric heat, it was estimated that the first cost of an electric heat system with three zone thermostats would be equal to the first cost of the gas-fired installation. If a fourth zone were added, the electric heat job would run higher in first cost than the gas installation, and operating costs would run considerably higher, the analysis showed.

# **Promoters Play Down Cost Factor**

Thus, there are disadvantages as well as advantages to electric heat — as there are with everything. Our objective here is to appraise both. Cost — particularly operating cost — would appear to be one of the more important disadvantages. But in this connection, it should be remembered that the utilities and others promoting electric heat for homes are usually not doing so on a straight cost basis. On the subject of cost, they stress more that "it won't cost as much as you might think."

And — as one utility engineer put it — "when you see some of the expensive automobiles on the streets these days, you realize buyers aren't too concerned about the initial or operating costs of anything."

# Who's Fighting Electric Heat?

# Counter-promotions shaping up

The growth of electric home heating in recent months is impressive. Even more so is the promotion being thrown behind it — and the interest in it of all segments of the heating industry. This is leading to counter-offensives, which may well affect the future growth of electric heat.

# **Gas Industry Promotion in High Gear**

Probably the first group that comes to mind as countering electric heat promotion is the gas industry, which of course has its all-gas program. Speaking at this year's sales conference of the Edison Electric Institute, G. W. Ousler, vice president of the Duquesne Light Co., said: "We have lost a considerable amount of electric load, which we should have had, to gas competition. Why? Because the entire gas industry has been conducting a unified, aggressive sales approach to the residential market at the national level, in addition to active sales programs at the local level. They have a unity of purpose. They have done a good job and have gotten results."

At the same meeting, B. C. Campbell, marketing vice president of Consumers Power Co., pointed out that "residential electric load builders are challenged, not only by the imposing dimensions of the job facing them, but also by competition from an aggressive, dynamic, rapidly expanding gas industry."

#### **Gas Utilities Look Ahead**

That gas utilities don't intend to relinquish their share of the home heating market to their electric competitors is evidenced in many ways—including statements made in a recent announcement of a thermo-electric device that can make electricity directly from the heat of a gas flame. While the main interest in the device is because of its possible application to generate current for electrolytic protection against corrosion of pipe lines, gas company officials were quoted as seeing the time when gas might be burned to generate

# **COMPETITION' TAKES ITS STAND**

ACTION PLANS UNFOLD on local and national levels to study the growth and methods of electric heating, determine whether to fight or promote it.

# THE GAS INDUSTRY

Unified, aggressive "all-gas" sales promotion, aimed at the residential market, on the national level, with local-level tie-in.

# THE OIL INDUSTRY

Stepped-up residential program, spurred by favorable results from a pilot promotion in the Pacific Northwest.

# THE COAL INDUSTRY

Lined up on the side of its customers, the electric utilities, for the residential heating market.

# THE WARM AIR INDUSTRY

Conducting various national, local and regional campaigns to promote quality heating with emphasis on proper air distribution; associations are appointing committees and devoting convention sessions to analysis of electric heating methods and competition.

# THE 'WET HEAT' INDUSTRY

Contractors' groups and national council have appointed special study groups to analyze the threat of electric heat competition.



electricity for home lighting, the "waste heat" being used to warm the house.

So one phase of the heating battle — as is also the case with summer air conditioning — is "electricity versus gas." (Some electric heat installations have been made because gas was not available. As gas permits open up, electricity faces this additional competition in many areas).

As to coal, insofar as the residential heating market is concerned, this industry seems to be allied with its customers, the electric utilities.

# **Associations Study Electric Heat**

Turning from the fuels involved to the equipment used, and to the manufacturers and installers of various types of residential heating equipment, we find contractor associations in the steam and hot water field organizing electric heat com-

> Lick 'Em, or Join 'Em?

# Warm air industry is at crossroads

Depending on the interest of the local electric utility — and the gas utility — in promoting space heating load; electric, gas and other heating fuel costs; the climate; how well summer air conditioning is being accepted by homeowners and home builders; competition; municipal and union practices regarding licensing, employment of journeymen, etc.; his independent business judgment — depending on all these, and on other factors as well, the residential warm air heating

mittees, and the Better Heating-Cooling Council, concerned primarily with hot water and steam heating, recently announced a committee that — among other objectives — will "combat the inroads of electric heat." The Northamerican Heating & Airconditioning Wholesalers, Inc., a warm air association, has an electric heat committee, and other groups representing both methods of home heating are devoting attention to electric heat methods and competition. The next convention of the National Warm Air Heating and Air Conditioning Association will have an electric heat session, for example.

# **Market's Worth Fighting For**

It thus seems reasonable to expect that, while utility promotion of electric heat will continue and will expand to other areas of the country, there will also be "counter-promotion" from those representing other fuels and from those concerned with other types of equipment. The residential heating market is a big market now and a market that will grow rapidly in the coming years. It's worth important money to fight for a share of it.

# UTILITY MAN SUMS IT UP

**GLYDEWELL BURDICK**, secretary of the Wisconsin Power & Light Co., who has done extensive experimenting with heat pumps and other heating methods, puts electric heating in the warm air heating dealer-contractor's domain. He says electric resistance heating will not continue to meet the expectations of customers, as it is not in itself capable of giving some of the high quality results of the better fuel burning systems because air handling is necessary for maximum comfort. The homeowner can't do without the services of the warm air heating dealer-contractor, he observes.

dealer-contractor must make some sort of decision on whether he should sell and install all types of electric heating (including resistance) for homes, or should compete against this method of heating. Similar decisions must be made by wholesalers, and by manufacturers.

# Warm Air Know-How Required

There are many arguments in favor of the sale and installation of electric heating systems of all types for homes by experienced warm air heating dealer-contractors instead of electrical contractors. Even though electricity conveyed by wiring is the "fuel," an electric heat system is first a heating system. The electrical work is only incidental to the purpose of the installation, which is to keep the house comfortably warm throughout, wall to wall, floor to ceiling, room to room, in all weather conditions, with varying kinds of house construction — and to do it economically and dependably. It is a matter of Btu's, not watts, and the heating man is the one who knows his Btu's. It's a job requiring skill and experience in heating, not in wiring, installing lighting fixtures, etc.

# **Air Handling Still Necessary**

Glydewell Burdick, secretary of the Wisconsin Power & Light Co., Madison, has said that electric resistance heating alone will not long continue to meet the expectations of customers, as it is not in itself capable of giving some of the high quality results of the better fuel-burning systems, because air handling is necessary for maximum comfort. The homeowner cannot do without the services of the warm air heating dealer-contractor, he emphasizes.

So the decision may be to get into all methods of electric heating, in addition to the other types of work now being done.

# **Promotions Beget Counter-Promotions**

On the other hand, the dealer-contractor (and wholesalers and manufacturers) may decide their best business move is to compete against electric home heating.

The electric heat promotion itself offers suggestions on how to compete with it. Many of the sales appeals or sales arguments used to promote electric heat, and responsible for its growth

# ELECTRIC HEAT PROMOTION HOLDS IDEAS FOR COUNTER-PROMOTION

- 1. It proves the power of aggressive promotion to advance an idea.
- 2. It divulges the public's interest in something modern, something to show off—year 'round air conditioning, for example.
- 3. It suggests that people aren't as conscious of operating costs as they used to be. This should be good news to dealer-contractors who promote year 'round air conditioning. And if people aren't inclined to discuss fuel costs, everyone's selling job will be easier.
- 4. It has made people more conscious of the advantages of full structural insulation to improve heating comfort and cut operating costs. This, of course, holds true for any kind of heating, although it's not as essential to warm air systems burning gas or oil.

to date, may be effectively applied to promote a warm air system fired conventionally. Other of these sales appeals can be used much more effectively for an electric furnace installation, an electric warm air baseboard diffuser job or a year round heat pump system than they can for a direct electric resistance installation without mechanical distribution of air.

#### Value of Promotion Is Proved

The first competitive lesson to be learned from electric heat is the tremendous importance of vigorous, thorough promotion. Electric heat is going in where it is *promoted*. Electric utilities have no patent on promotion. So that's a primary point: skilled, intensive promotion.



Another lesson is the consumer appeal achieved by labeling electric heat as "new" and "modern." So is a good warm air heating system — and more so. More so, because it can provide — feasibly and economically — air circulation, air cleaning, humidification, dehumidification, summer air conditioning. Is a straight electric heat job modern, or is it a step backward? Is it progress to return to "just plain heating" in winter, or is it more modern to have winter air conditioning as well as summer air conditioning (or provisions for its addition later)?

# **Upgrade to Compete?**

A third lesson is two-edged - the matter of operating costs. Certainly, the admittedly lower fuel cost of other methods of heating is a powerful, obvious sales argument to homeowners (if not always, or to the same extent, to home builders or apartment building owners.) But if it's true that people aren't too conscious of costs these days — and at least some of the electric utilities base their thinking on this premise then it's also true so far as other methods are concerned. This can lead to the conclusion that the smart way to compete with electric heat is to sell complete, quality warm air systems with air circulation, air cleaning, humidification, dehumidification, zone or individual room control, summer air conditioning - complete year 'round

comfort. Or use electricity for heating, if that's what the customer wants, but with a heat pump, electric furnace, electric duct heaters, or electric warm air diffuser system that can provide all the year 'round comfort benefits.

The "full house insulation" recommended for electric heat jobs can also cut the cost of burning any other fuel used for heating. Full structural insulation has other advantages, too, in improving comfort conditions by raising wall surface temperature and thus cutting radiant heat loss from the occupant's body to outside walls.

# **Combat or Adapt Sales Appeals**

The other sales appeals used for electric heat, summarized earlier in this report, can be analyzed one by one and either combatted or adapted to other methods of heating. Consider, for example, the point made for electric heat that "there are no dirty air filters to change." Isn't that just a way of saying that "the air is not filtered"? Is that a sales point for or against an electric heat system?

If a method of heating — or doing anything else — has more merit than other methods, it will be bought and used. But it is up to the skilled, experienced dealer-contractor to explain, carefully and constantly, the merits of the type of installation, the kind of equipment, the individual product features of the systems he sells and installs.

Meet a warm air heating dealer-contractor who "joined 'em" . . . and is glad he did



# 'Expanded' Business Offers

# **Electric Forced Air Heating**

Recognizing an opportunity to cash in on a rich, thoroughly sold market, this warm air heating dealer-contractor took on electric heating, helps prospects make up their own minds about the type of system they want, after giving them all the facts about costs and comfort



PLANS FOR ELECTRIC forced warm air heating layout are reviewed by salesman Jim Staab (left) and Edward L. Pruitt, president and general manager, Metal-Air Corp.



PROPOSAL FOR FORCED WARM AIR electric heating system is dictated by Edward L. Pruitt immediately after his conference with the salesman to be sure all the points they discussed are included before the proposal is presented to the prospect

IMPRESSED WITH THE QUALITY and effectiveness of the electric utilities' stepped-up promotion of electric home heating to create additional loads for its lines, Edward L. Pruitt, Metal-Air Corp., Springfield, Ill., expanded his heating business to capitalize on the utilities' efforts to build heating sales.

Homeowners who are interested in electric heating find Metal-Air salesmen well versed on the subject, as the result of a continuing study of the intricacies of using electricity as the source of energy for residential heating.

## **Salesmen Correct Impressions**

The purpose of this information service is to acquaint prospects with the many factors involved in good heating and impress them with the need to consider all these factors



"... the firm adheres fast to its policy of installing only quality equipment which will keep each customer convinced he has purchased the best possible installation of its type"

TEMPERATURE OF DELIVERED AIR is checked by salesman Jim Staab to determine heating output of electric furnace



AIR DELIVERY through each diffuser opening is checked before decorating is completed to be sure that debris has not fallen into diffuser opening preventing free flow of air to the critical heat loss areas from diffusers on each side of door

when they select the equipment they will live with for the next 15 or 20 years.

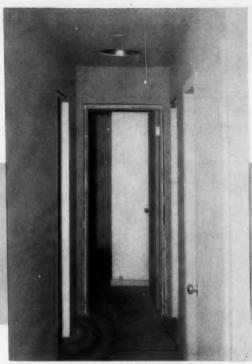
Data accumulated by the Metal-Air staff shows that many ideas people have about electric heating are founded on erroneous and misleading information. Salesmen correct these impressions, thoroughly answer builders' and prospective house buyers' questions and back up their answers with facts and figures from their own studies and other reliable sources. Many electric heat prospects report that they have been told electric resistance heating can be installed for about half the cost of a forced warm air system. Metal-Air salesmen do not contradict this statement but point out that additional wiring, etc. boosts the cost of an electric resistance heating job about \$400, bringing the total to about the same as a well-designed and installed forced warm air system.

They follow up this discussion with a rundown on additional

features of a forced warm air distribution system: 1) it is the only type of system which can accommodate add-on air conditioning without designing and installing a complete air distribution system; 2) it provides heat for the basement, which no other type of electric heating arrangement can do; and 3) it alone provides good ventilation, humidification and air filtering. Other advantages of forced air distribution are brought out skillfully by the salesmen in the ensuing conversations.



CAPACITY AND OPERATION of electric furnace are checked to assure trouble-free operation after occupancy



CEILING RETURN AIR OPENINGS are connected to insulated return air system in attic

#### **Utility Offers 1c Rate**

The number of electric heat installations is growing rapidly in the Springfield marketing area, which has a population of about 100,000. The electric utility has offered a rate of 1c per kwhr for power used in electric heating. To make sure Metal-Air Corp., which currently does \$750,000 business annually, gets its share of the business thus attracted, management and salesmen hold daily sales conferences to discuss each job and each sales call scheduled that day.

The firm not only sells electric furnaces but also promotes heat pumps, 18 of which were sold during the first three months of 1959.

#### **Comparison Favors Forced Air**

When a proposal is made for installing equipment using electric power, Mr. Pruitt examines the floor plans with the salesman who made the contract. Together they decide on a proposal, then write it out before the salesman again contacts the builder or home owner. Mr. Pruitt says, "Once we have an opportunity to present a true comparison between forced warm air and straight electric resistance heating, we have very little trouble convincing our prospects of the advisability of selecting forced warm air distribution for their homes."

Electric forced warm air heating systems are installed according to recommendations for the standard air distribution arrangement in the National Warm Air Heating and Air Conditioning Association manuals.

## Slabs Insulated from Footings

In houses built on concrete slabs, the duct is embedded around the perimeter of the slab, which is insulated from the building footings. The 2 in. insulation extends 12 in. down the footing and 12 in. back under the slab. The material does not absorb moisture and maintains

insulating efficiency indefinitely.

Diffusers are located near all points of major heat loss. Return air usually is taken from each room and corridor into an insulated duct in the attic.

#### **Final Check Avoids Callbacks**

Soon after the building reaches the decorating stage, the system is inspected and equipment performance is checked. To make sure no ducts or openings have been obstructed during construction, the air flow and air temperature are checked at each outlet. The equipment is operated and double-checked to avoid the necessity of returning for service or adjustment after the building has been occupied.

Regardless of the type of system installed, the firm adheres fast to its policy of installing only quality equipment which will keep each customer convinced he has purchased the best possible installation of its type.

# Georgia's Capital Dome



WORKMEN INSTALL nickel-copper alloy squares on dome. Old terra cotta tiles were covered with asphalt-cement to provide a smooth surface, then the metal squares were secured with cleats and nails of the same nickel-copper alloy. Channel type battens appear at left on finished portion

The superiority of metal for covering roofs and domes of public and monumental buildings was recognized by the architects who redesigned the Georgia State Capital building in Atlanta. The terra cotta tiles used for the original roof were covered by 18 × 18 in. nickel-copper alloy squares in a functional diamond pattern. R. F. Knox Co., Atlanta sheet metal contractor, fabricated and installed the roof, cornices, moldings and rain carrying equipment, all utilizing nickel-copper alloy.

Remodeling the 8400 sq ft dome, the largest diamond pattern dome ever completed, took nearly two years. Diameter at the base of the 70 ft dome is 62 ft. The tip is 227 ft above the ground.

# Lots of Sheet Metal

Over 42,000 lb of nickel-copper alloy went into this roofing job, in the following quantities:

31,000	lb	24 ga	(0.025 in.)	for the dome squares
7,000	lb	18 ga	(0.050 in.)	to sheathe the columns and side wells and for bannister capping
1,300	lb	14 ga	(0.078 in.)	for the promenade around the cupola
3,000 106		20 ga	(0.037 in.)	for miscellaneous applications nickel-copper alloy nails for fastening the squares

#### Use 42,000 lb of Metal

Over 42,000 pounds of the nickelcopper alloy sheet were consumed in the job.

To facilitate installation of the metal panels, a tubular scaffold was erected with catwalks at three levels. The cost of the scaffolding exceeded the cost of all the nickel-copper alloy sheets.

# **Use Ductile Roofing Sheet**

The nickel-copper alloy squares for the dome covering were made from

# **Gets Sheet Metal Face-Lifting**

Nickel-copper alloy squares in a diamond pattern and vertical batten seams combine exceptional beauty with a low expansion coefficient in a big roofing job which took two years to complete

roofing sheet, which is more ductile than standard hot-rolled nickel-copper alloy sheet. Its maximum hardness (Rockwell "B" scale) for thicknesses slightly less than 0.031 in. is 60.

The 18 in. square size is both functional and decorative. It easily conforms to the double curvature of the dome. The small square readily absorbs and transmits expansion, and laid in the diamond pattern, it presents a pleasing and unusual appearance.

#### **Joints Are Lock Seamed**

The squares were prepared for single lock seam jointing, with nickelcopper alloy cleats and nails. Edges were turned up in fabrication for the lock-seam installation, then folded over and turned down on the job.

The original terra cotta tiles were left in place. Because they were uneven in height, they were covered with an asphalt-cement mixture to provide a smooth surface for application of the squares. The asphalt-cement mixture was applied with a trowel, ½ to 1½ in. thick to provide the necessary smooth foundation.

#### **Battens Run Vertically**

A number of battens, forming channel ribs, were specified in the



WORKING CONDITIONS FOR SHEET METAL WORKERS were both improved and impaired by multitude of scaffold supports needed. Note expansion joints at lower right which are ready to be capped

# SHOP KEEPS UP

. . . with erection crews, producing the intricate shapes of dome's architectural features from nickel-copper alloy sheets



PRE-FORMED SECTIONS FOR CLERESTORY WINDOWS were stamped out with shop tools and assembled into four major parts before being sent to the job site



CORNICE MOLDING FOR CLERESTORY was fabricated on power brake in shop before being sent to job site. Each was checked against model for accuracy



METAL WINDOW FRAME parts were checked and tested in shop on completion of the individual sections



THREE COMPLETED DOWNSPOUT CONDUCTOR HEADS exhibit the intricacy of fabrication required to produce cover for the building's special architectural features. Evidence of accurate bending shows high degree of skill required of sheet metal workers on this project

remodeling plans for the dome. The raised battens run vertically at regular intervals around the circumference. These battens vary in height from approximately 3 in. at the top to 6 in. at the bottom, and in width from about 8 in. at the top to 12 in. at the base of the dome.

#### **Provide Expansion Areas**

One of the most important functions of the battens is to provide expansion areas for the dome covering. Due to the strength of the alloy, expansion movement is transferred to protected areas where the edges of the squares are turned up beside the battens or ribs.

Channel caps of 18 gage, 0.050 in. nickel-copper alloy sheet cover the turned-up edges of the squares and the curved battens or ribs. Each cap is fastened along the sides of the main rib section with sheet metal screws. No filler material or other structural material was used in the rib.

## Cleats, Nails Hold Squares

Holes for the nails were drilled, as each square was laid, through the asphalt-cement mixture and into the old terra cotta tiles underneath. Each square was anchored with nickel-copper alloy cleats. Two nails were driven through the cleat, then the metal edge was turned over to cover the nails. No special joint preparation was necessary; the cleats and nails hold the squares securely in place. Bends and crimps were easily made on the job, usually with rubber-covered mallets.

Sheet metal screws were used where the nickel-copper alloy sheet was applied to the flat surfaces on the roof.

## Stresses Are Transferred

One of the reasons for selecting the nickel-copper alloy for this installation was its relatively low coefficient of expansion, which minimizes the tendency to "crawl" on the dome's surface during temperature changes. Stresses occurring during tempera-

# Something must have been said about gilding the lily

When original plans to gild the dome with gold leaf were cancelled, the local citizenry took over, panned the required 42 oz of gold from streams in nearby gold fields and had it converted to leaf which was rolled onto the completed nickel-copper alloy roof

ture changes are transferred to expansion joints installed according to the architect's specifications.

The sub-structure supporting the rounded part of the dome, found to be in very poor condition, was rebuilt with 2 million lb of limestone. Portions of the clerestories which had disintegrated were torn out and replaced with redwood, to be covered later with the nickel-copper alloy.

### Make Intricate Shapes in Shop

While this work was going on, nickel-copper alloy sheets were being fabricated into the intricate, detailed shapes of some of the architectural features in the Knox shops. Cornices for the cupola and dome were formed in a power brake and stamped in circular dies. Downspout conductor heads were machine formed and bench assembled. Moldings for the circular windows of the clerestory were formed in eight sections each. which formed a complete circle. The circular moldings were designed to be held in four triangular corner framing sections mounted in square openings in the clerestory wall.

Cupola columns and cappings for the bannister running around the cupola were covered with nickelcopper alloy.

Total man-hours for this installation was no more than it would have been using other sheet metal roofing materials.

Original plans had called for gild-

ing the completed dome with gold leaf. The idea was rejected as unnecessary extravagance but a group of public-spirited citizens of Dahlonega, in north Georgia's gold rush country, came forward with an offer to supply the gold.

# **Citizens Supply Gold for Roof**

All last summer, volunteers were organizing gold panning expeditions to the creek beds of the "gold country." Even tourists visiting the area were pressed into service to spend a few hours panning for gold.

The necessary 43 oz of the precious metal was soon collected and ceremoniously brought down to Atlanta by old-time wagon train.

Converted to leaf in Philadelphia, the gold was applied by steeplejacks swinging along the completed sides of the dome in bo'sun's chairs.

## Gold Leaf Rolled On

To insure a good bonding surface for the leaf, the nickel-copper alloy sheet was first painted with a primer of zinc chromate alkyd resin. Then a second coat of yellow base and a third coat of glossy white lead were applied. Finally, the painted surface was coated with a yellow oil sizing and the gold leaf was rolled on.

The editors acknowledge the cooperation of The International Nickel Co., Inc., in providing information and photographs for this article.

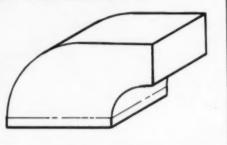
# How to Lay Out a

# 90 Deg Rectangular Reducer Elbow

... using the time-saving and accurate simplified method; and how to calculate the air velocity which will result from the change in area

# Can you develop this pattern in 30 minutes?

Here's a new and accurate approach to the development of sheet metal patterns that will cut costly layout time. The method applied to this month's fitting can be used as a guide to develop related patterns and solve other problems encountered at the layout bench



WHEN A CHANGE of area is required in a 90 deg rectangular elbow we must determine what change in air velocity will result. In this month's pattern problem for example, the dimensions given in inches for Figs. 1 and 2 would be converted to feet. Thus, the dimensions will be 2 ft 6 in. X 1 ft 6 in. at the large end of the elbow and 1 ft × 1 ft 6 in. at the small end. Assume the furnace fan has an output volume rating of 1200 cfm. To find the air velocity when the volume and duct area are known, the formula is: Volume (cfm)/Area (sq ft) = Velocity (fpm).

Thus the sq ft area of the large end is found by multiplying 2.5 ft by 1.5 ft = 3.75 sq ft. The velocity is found by dividing the 1200 cfm by 3.75 sq ft = 320 fpm. The small end area is found by multiplying 1.5 ft by 1 ft = 1.5 sq ft. The

volume (1200 cfm) is divided by 1.5 sq ft to establish a velocity of 800 fpm.

To develop the pattern for this type of reducing fitting by the simplified method, the correct procedure is to lay out the front pattern (Fig. 2) first. The lengths for the back and throat patterns can then be determined by measuring the lengths A to H on the back of the elbow pattern (Fig. 3) and length B to G on the throat of the elbow.

The maximum time required to lay out the patterns for this fitting should no be more than 30 minutes.

Given the front and end views of a 90 deg rectangular reducer elbow, the following is a step-by-step analysis of the pattern problem.

## Front, Back Patterns, Fig. 3-

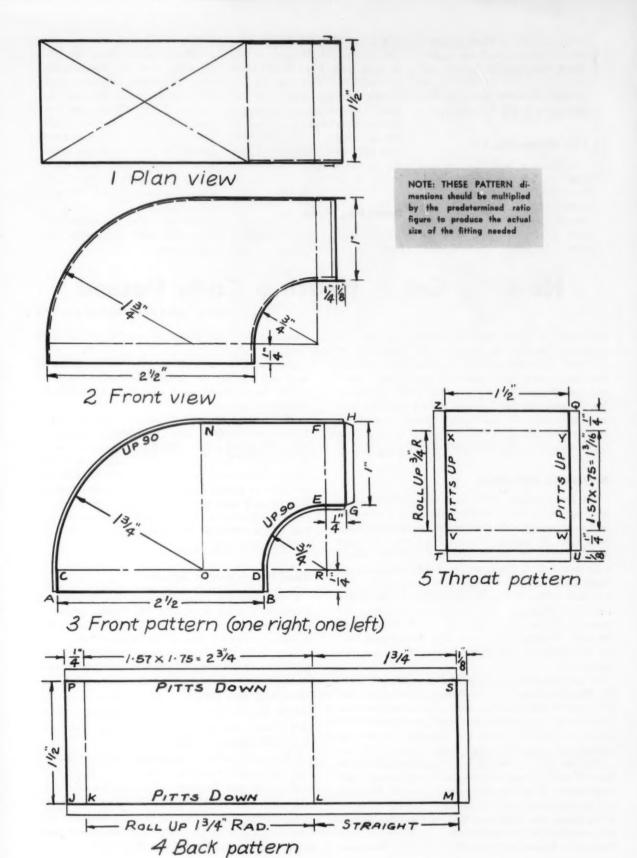
a) Draw a 2½ in. horizontal line and identify its terminals as

points A and B. From both points draw lines upward and perpendicular to line AB. Measure up ½ in. from both points and locate points C and D. Draw a line from point C, extending through and to the right of point D.

b) Measure 34 in. to the right of point D and locate point R. From point R draw a line perpendicular to and above line CD. With R as center and the given radius 34 in., draw a 90 deg arc upward from point D. Identify the intersection point of the arc and the perpendicular line above point R with the letter E.

c) From point E, measure up 1 in. on the perpendicular line and locate point F. Set a compass at length RF (13/4 in.), and with point C (Fig. 3) as center, draw an arc to intersect line CD. Label the intersection point O.

d) With point O as center and



radius OC, draw a 90 deg arc above point C. From point F draw a horizontal line tangent to the arc. Measure ¼ in. to the right of line EF and draw the line GH. Connect points H and F, E and G.

## Back Pattern, Fig. 4-

a) Draw a horizontal line and label the left extremity point J. From Fig. 3, transfer the ½ in. length AC, arc length CN and straight line NH to the right of point J (Fig. 4) and mark the points K, L and M. Through points

J, K, L and M draw lines perpendicular to line JM. Measure up 1½ in. from points J and M and locate points P and S. Draw line PS.

(Note: The arc length CN can either be measured with a flexible ruler or determined by the mathematical formula: radius times constant 1.57 equals the length of a 90 deg arc. Thus, the 1 3/4 in. radius  $\times$  1.57 = 23/4 in.)

# Throat Pattern, Fig. 5-

a) Draw a 1½ in. horizontal line. Label its terminal points T and

U. From both points draw lines perpendicular to and above line TU. Working from the throat radius (Fig. 3) transfer the collar length BD, the arc length DE and the straight length EG to the perpendicular lines drawn from points T and U (Fig. 5), and establish the points V, X and Z on the line above point T. Also establish points W, Y and Q above point U. Draw lines connecting points V and W, and points Z and Q.

Add allowances for seams and joints and mark the patterns for fabrication.

# How To Get a Heating Code Passed

. . . and a local association started

The Need for a new warm air heating code and for a progressive heating association in the Charleston, W. Va. area was recognized four years ago by a group of local dealer-contractors headed by Irving Abrams, who is now president of Major Appliance Center, Charleston. Mr. Abrams took the first step toward achieving these goals by inviting all local firms interested in warm air heating to attend a meeting to organize an association and discuss framing a new code.

## Response Is Enthusiastic

The heavy response to his invitation — 42 companies sent representatives — indicated the general awareness in the community of the need for better conditions in the local warm air heating industry. The Charleston Warm Air Contractors' Association was thus born, and officers were elected: L. C. Black, Heating & Cooling, Inc., president; D. B. Gibson, Duling-Gibson Heating Co., vice president; Milton Duling, Duling Heating Co., secretary; and W. N. Whinnery, Miller Heating Co., treasurer. Also named to the executive committee: E. W. Tabor, Goff-Matthews Plumbing Co.; Harry Eby, Save Supply Co.; D. D. Ekleberry, Ekleberry Heating Co.; and Mr. Abrams.

A code committee was appointed immediately: Edwin W. Tabor, chairman; R. L. Brogan; Harry Eby; and Roy Jones Jr. The committee studied the codes other cities had adopted, rewrote and adapted the provisions to local conditions. The final draft was submitted to the city council and approved a month later.

The code provides for a board of examiners, including the city building inspector, the chief fire inspector and three warm air heating dealer-contractors, all of whom are appointed annually for one year. Current members of the board are: William E. Kirk, city building inspector, president; Mr. Abrams, secretary; J. W. Britton, Fire Prevention Bureau chief; E. W. Tabor, Goff-Matthews Plumbing Co.; and Mitchell Kryzak, M. W. Kryzak & Sons

The board conducts examinations for applicants at least once a month. The written examinations are based on the National Warm Air Heating and Air Conditioning Association manuals.

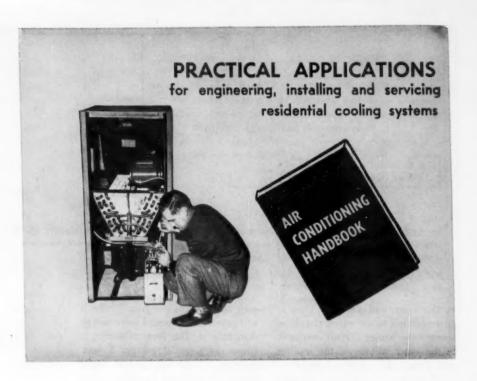
All "persons, firms or corporations engaged in the business of installing, altering, repairing, cleaning or adding to any warm air heating system" must secure licenses before doing such work. The initial fee is \$100 and the license must be renewed annually for \$25. Permits must be secured from the building inspector's office. Fees for such work are: \$3 to replace an old furnace if no ductwork is involved: \$1 to install a furnace on a new job; \$1 for each ductwork opening up to five; \$.25 for each additional opening.

#### **Allow Time to Correct Defects**

Every completed installation must be inspected and approved. If a job is rejected, the licensee receives a written notice stating the reasons for the rejection, and is allowed reasonable time to correct the defects.

From the beginning the association had the active support of almost all warm air heating businesses in the area—suppliers, distributors and dealer-contractors. In addition, both local utilities—the United Fuel Gas Co. and the Appalachian Power Co.—cooperated actively. Both became associate members and let the group use their auditoriums for meetings.

Following the adoption of the new warm air heating code, the association issued certificates of appreciation to those who were instrumental in formulating the code and securing its acceptance: John T. Copenhaver, mayor of Charleston; W. E. Kirk, city building inspector; and John A. Shanklin, member of the city council and head of the West Virginia Heating and Plumbing Co.



# **How Heat Is Transferred**

A review of the fundamentals of heat transfer
—the basic concept involved in air conditioning—
will explain some of the reasons
behind the rules we follow in design and engineering

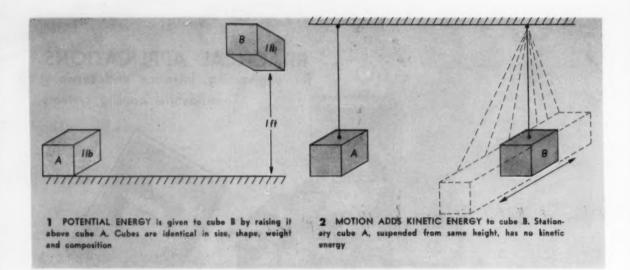
By S. W. Reid
Air Conditioning Engineer
Gilbert Associates, Inc.

UNDERLYING MANY of the phases of air conditioning and heating work is a fundamental phenomenon of nature known as the process of heat transfer. These relatively simple words give no hint of the importance of this process nor of the vast human effort that has been and is being expended in seeking an understanding of it. Many of its fundamentals are, of course, well defined and easily understood. Since the sciences of air conditioning and heating as we know them

today could not exist without the application of the basic principles of heat transfer, an acquaintance with these principles is essential.

### **Trace Heat Transfer in Home**

Consider a summer air conditioned house in terms of heat transfer processes. Heat from the sun or the atmosphere is transferred to the outer walls and glass surfaces. From here it flows inward through the structure



to the inner wall surfaces. Then it is transferred to air which circulates through the house. The air carries it to the outer surface of the cooling coil. From here it is transferred consecutively to: 1) the inner coil surface; 2) the refrigerant; 3) the inner metal surface of the condenser coil; 4) the outer coil surface; and 5) the outdoor air or cooling water. If water is the cooling medium another transfer occurs as the water gives up the heat to the air again.

#### **Studies Produce Working Data**

At one time or another, each heat transfer process has been studied and analyzed with respect to many different materials and combinations thereof. This accumulated data, available to us today, is invaluable in the calculations we use to evaluate with reasonable accuracy the amount of heat that will be transferred under almost any condition.

#### **Height Adds Potential Energy**

Let's examine the nature of heat itself. We know heat is a form of energy, but do we really know what energy is? Suppose we have two physically identical iron cubes. We lay cube A on a table and lift cube B one foot above the table (Fig. 1). Cube B now differs from cube A in that it possesses, because of its greater helght, more energy than cube A. If

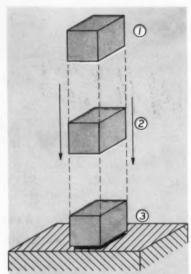
each cube weighs one pound, cube B will have one foot-pound more energy than cube A. This form of energy is known as potential energy. In our example, this potential energy might be said to be stored in cube B since it is available for our use any time we wish to drop the cube to the table to perform some useful task requiring this energy. Energy, therefore, is really nothing more than the capacity to do work.

#### **Motion Lends Kinetic Energy**

Now suppose we hang each cube from a piece of string at the same elevation and set cube B in a swinging motion while cube A remains stationary (Fig. 2). Once again cube B has, by reason of its motion, more energy than cube A. This form of energy or capacity to do work is known as kinetic energy.

#### **Energy Can Be Converted**

One type of energy may be readily converted to another form. Consider once again the elevated cube B in Fig. 1. At the 1 ft height, the energy it possessed with respect to cube A is 100 percent potential energy. Now let's drop cube B toward the table. When it gets half way it has only half as much potential energy (energy of height) as it had at the 1 ft level. The other half of the original energy has been transformed into



3 DROPPING THE CUBE transforms its energy from 100 percent potential at position 1, to 50 percent potential and 50 percent kinetic at position 2, to 100 percent kinetic just before striking table at position 3. After landing on table, original energy is absorbed in cube in form of heat

kinetic energy (energy of motion). Just before the cube reaches the table, it has no potential energy—all of it has been transformed into kinetic energy.

Recognition of these varied forms of energy and careful measurements of the transformation from one form to another have led to formulation of a principle of physics known as the Conservation of Energy. This tells us in effect that in any system which neither receives energy from without nor gives up any, the total amount of energy is unchanged. Thus, just before our falling cube strikes the table, it has exactly the same amount of kinetic energy as it originally possessed in potential energy.

## Internal Energy Is Produced

As the cube strikes the table and comes to rest, a second transformation of energy occurs. This time the kinetic energy of the cube is converted into internal energy in the iron which comprises the cube. This would be evidenced by a rise in the temperature of the cube (although in this particular case it would be infinitesimally small). A more pronounced illustration of this type of transformation is the heat generated in a bullet as it strikes a hard surface.

We have seen that matter such as an iron cube can possess energy in at least three different forms, two of which, having to do with position or motion, might be called external energy and the third, affecting the molecular structure of the matter itself, is termed internal energy. Just as the external energy is stored in the matter by reason of its position and motion with respect to other matter, so is internal energy stored in the matter by reason of 1) the relative vibratory activity, and 2) the relative displacement of the molecules which constitute the matter.

## **Vibration Raises Temperature**

The first of these two types of internal energy referred to above may be illustrated using ice. Suppose we start out with a cube of ice at zero F. We add energy slowly with a flame, being careful not to melt the surface. The cube absorbs this energy, in the form of increased vibrations of the molecules. There will be no change in the appearance of the cube as energy is added (so long as it does not melt). We can check our progress in adding energy by measuring the

#### THIS SPECIAL SERIES

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cube temperature. When it reaches 32 F we know we have added all the energy the cube can absorb without melting. This energy which causes a change in temperature is commonly called sensible heat since it is heat that can be detected by our sense of touch.

### **Molecules Separate**

The second type of internal energy is illustrated by the change of ice to liquid. Starting with the cube of ice at 32 F. we continue to add energy with a flame. The small molecules of water, which are held firmly in a comparatively fixed position in the solid cube, are no longer able to absorb additional energy by an increase in vibration. Therefore, they are dragged away from each other and freed to slip past each other in the liquid state. The energy absorbed by the water in changing from a solid to a liquid causes no change in molecular vibration, and therefore is not sensed as a temperature change. The name commonly applied to this type of internal energy is latent heat, the word latent meaning not apparent or hidden. Farther up on the temperature scale, water can absorb an additional amount of latent heat as it changes to vapor.

Storage of internal energy as both sensible and latent heat can be demonstrated also by applying heat to an iron bar.

When exposed to flame, the bar's temperature rises, reflecting the stepped-up molecular activity as sensible heat is absorbed. The bar also expands, in spite of the strong attraction between the molecules which comprise it. The internal energy which causes the expansion is latent heat — although it is stored in the bar, it adds nothing to the temperature.

Heat energy is transferred from one place to another by: 1) conduction, 2) convection, and 3) radiation. Let's review each of these processes briefly.

### **Heat Diffuses Through Matter**

Conduction is the diffusion of heat energy through matter from one particle to the next, from the warmer area (where the molecular activity is greatest) toward the cooler area (where the molecular activity is least). Heat travels from the outer to the inner surface of a wall during summer largely by conduction. Heat is also transferred from the outer surface to the inner surface of a cooling coil by conduction.

## **Moving Matter Carries Heat**

When heat is carried along by the motion of a stream of gas or liquid, the process is called convection. Examples of convection are steam flowing through a pipe, air flowing in a warm air heating or air conditioning system or water heated in a kettle. In the latter, heat applied to the bottom causes some of the water to expand. Being less dense than the cooler water above, it rises. The cooler water simultaneously flows downward. This mixing action carries heat rapidly to all portions of the kettle. If heat were applied to the side of the kettle near the top, convection currents would not be established. and the water would become heated only through conduction. The motion of the fluid in convection may be created either by gravity, as in the case of the kettle, or by some mechanical device such as a fan or pump.

# **Radiant Energy Becomes Heat**

The third method of heat transfer. radiation. differs from conduction and convection in that heat is not carried through or by matter. All bodies give off heat in the form of radiant energy which is an electromagnetic wave phenomenon similar to light, but of longer wave length. The radiant energy does not become heat until it strikes certain objects. Solar radiation is a pertinent example for this discussion. This energy travels millions of miles through cold space but does not become heat until it strikes the earth or some other material it cannot pass through.

In our example using the falling cube, we saw how the initial potential energy of height was converted to kinetic energy of motion and finally to internal energy in the form of sensible heat. Many early experimenters sought to determine the relationship of mechanical work to heat. They found, for instance, that the temperature of water could be raised by the energy of intensive churning as well as by the energy imparted from a flame. Careful measurements showed that 778.26 ft lb of mechanical effort is necessary to raise the temperature of one pound of water one degree Fahrenheit. If this same amount of energy is supplied by a flame or some other heat source, it is defined as one Btu. Thus, we have the unit by which heat is evaluated mathematically.

## **Equation Measures Heat Flow**

The familiar mathematical expression for heat flow through a wall is  $Q = UA (T_1 - T_2)$  where Q = heat flow in Btu per hr; U = overall heat transfer coefficient in Btu per hr per sq ft per in. per deg temperature difference; A = surface area in sq ft;  $(T_1 - T_2) =$  temperature difference which causes

heat to flow. Of the four symbols used in the heat transfer equation, the U is the only one that is sometimes confusing. The reason is perhaps that the various tables in which it appears also contain similar values labled k and C

The symbol k is reserved for expressing the amount of heat that can

flow through a single material 1 sq ft in area and 1 in, thick when the temperature difference amounts to 1 deg F.

#### Surface Film Restricts Flow

Thus, a piece of copper of such dimensions would transmit 2690 Btuh per sq ft area per in. thick per deg F. This value applies only to the copper itself if it were sandwiched, say, between two other similar pieces of copper. It is not the amount of heat this piece of copper could transmit from air on one side to air on the other side. The reason is that a surface film of air exists on either side of the copper which severely limits the overall amount of heat that could flow.

#### How Much Heat Can Flow?

Since most of the heat transfer processes in heating and air conditioning involve heat flow between gases or liquids and solids, the surface film concept is most important. How much heat could flow from air to air through the piece of copper described above? The *U* symbol stands for the overall conductance including the two surface films and the copper itself. Thus:

Conductivity of copper (k) = 2690 Btuh/sq ft/in./deg F.

Conductance of still air film = 1.65 Btuh/sq ft/film thickness/deg F

1/U = 1/1.65 + 1/2690 + 1/1.65 = 0.61 + 0.00037 + 0.61 = 1.22

U=0.82 Btuh/sq ft/deg F overall.

Note that the high conductivity of the copper has practically no influence whatever on the total amount of heat that can flow in this particular case.

The symbol C has practically the same meaning as k except that it is used for materials in which the 1 in. thick limitation of the k value has no significance. Thus, it is applied to a brick or a cement block or to the air film referred to above. It applies to the thickness of the material as it actually exists.

# What Is 'Air Conditioning'?

True air conditioning provides comfort in all seasons, according to the American Society of Heating, Refrigerating, and Air-Conditioning Engineers. ASHRAE defines air conditioning as:

"Air conditioning is the process of treating air so as to control simultaneously its temperature, humidity, cleanliness and distribution to meet the requirements of the conditioned space."

# Conference Session a Feature of ARI's Atlantic City Show

Exposition Opens November 2, Runs Through November 5. Session on November 3 To Show Importance of Air Conditioning and Refrigeration in Today's "American Way of Life"

What air conditioning and refrigeration mean to America's way of life—and how essential they are to the health, productivity, and defense of the U. S.—will be highlighted at a conference in Atlantic City's Convention Hall at 9:30 a.m., Tuesday, November 3. This "conference session" is a special feature of the 11th Exposition of the Air-Conditioning and Refrigeration Industry, to be held in Atlantic City starting Monday, November 2, and running through Thursday, November 5.

A meeting of the members of the Air-Conditioning and Refrigeration Institute will be held November 1. Also meeting in Atlantic City at the time of the show are the Refrigeration Service Engineers Society, the Air-Conditioning and Refrigeration Wholesalers, and the National Commercial Refrigerator Sales Association.

Speakers scheduled to address the November 3 conference session are:

Joseph Rorick, assistant for planning and construction, International Business Machines Corp., who will speak as the representative of a large industrial user of air conditioning. IBM not only utilizes air conditioned factory space, but many of its products require controlled conditions of temperature and humidity for their operation.

Thomas R. Casberg, staff specialist, mechanical equipment and systems, Office of the Assistant Secretary of Defense, Properties and Installations, who is responsible for the establishment of design, construction, maintenance, and operation programs related to mechanical equipment in the far-flung Defense Department, will speak on the need for cooperation between the department and the people who produce the essential equipment for the literally thousands of applications of air conditioning and refrigeration in the nation's defense establishment. His talk also will outline broadly the Defense Department's policy on air conditioning, and is expected to refer to the department's exhibit of applications of the refrigeration cycle in the convention hall.

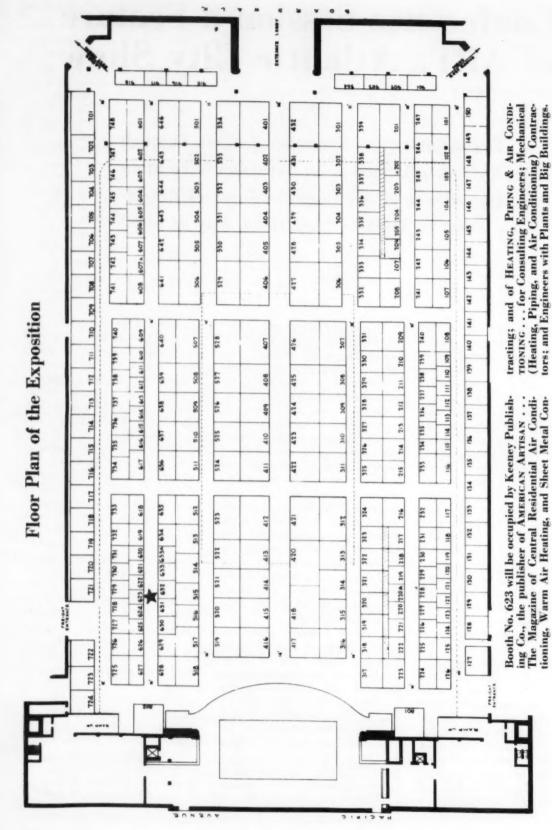
Arthur S. Goldman, market research director of House & Home magazine, whose discussion will be on the market for residential air conditioning, with suggestions on how this market may be developed.

Harold J. Humphrey, president of the National Association of Frozen Food Packers, who will cover the necessity for refrigeration equipment in today's food distribution scheme.

Rudy Berg is president of the ARI, which is sponsoring both the exposition and the conference. R. H. Luscombe is chairman of the exposition committee, and R. K. Serfass, vice president of the ARI, will preside at the conference session. A complete list of the names and booth numbers of the exhibitors, together with a floor plan of the exposition showing the space locations, as furnished by the ARI and up-to-date at presstime, is published here for the convenience of HPAC's readers who plan to visit the show. Also published here are highlights of the displays that will feature air conditioning equipment and products. This information was also made available by the ARI, to whom it was reported by the various exhibitors.

#### **Show Hours**

	November 2 2	
Tuesday	November 3 10	a.m. to 6 p.m.
Wednesday	November 4 10	a.m. to 6 p.m.
Thursday	November 5 10	a.m. to 4 p.m.



### THE EXHIBITORS AND THEIR BOOTH NUMBERS

As furnished at presstime by the exposition's sponsor

Acme Steel Co 619	Ebco Mfg. Co	Olin Mathieson Chemical Corp. 327-28
Addison Products Co	Edwards Engineering Corp 303	Olsen, C. A., Mfg. Co 402
Aeroquip Corp	Electro Dynamic Div., General	Onan, D. W., & Sons, Inc 626
Air Conditioning, Heating &	Dynamics Corp104	Owens-Corning Fiberglas Corp 701
Refrigeration News		Owens could a mergine corps 11101
Air Conditioning, Heating &	Electro Therm, Inc	Paragon Electric Co 638
Ventilating	Elkhart Products Corp	Peerless of America, Inc233
	Encyclopaedia Britannica 239	Peerless Equipment Corp 628
Air Con Filter Co	Evans Mfg. Corp	Penn Controls, Inc 505
Airserco Mfg. Co 206-7	Federal Refrigerator Mfg. Co 103	Pennsalt Chemicals Corp
Airtemp Div., Chrysler Corp.	Fogel Refrigerator Co 126	remisan Chemicais Corp 202
	Foster Refrigerator Corp 121	R-B-M Controls Div., Essex
Alco Valve Co	Frankell Mfg. Co., Inc 238	Wire Corp
Allen-Bradley Co746-47	Frick Co	Ranco Inc
Allin Mfg. Co		
Alter, Harry, Co., Inc 120	Frigid Igloo Mfg. Corp646	Reading Tube Corp
Aluminum Foundries, Inc 629	Fromson Orban Co	Recold Corp
American Artisan623	Furnas Electric Co 613	Refrigeration & Air Conditioning
American Automatic Ice Machine	Gem Refrigerator Co 903	Business
	General Chemical Div., Allied	Refrigeration Appliances, Inc. 513-14
Co., Inc	Chemical Corp	Refrigeration Research, Inc 208
American Brass Co 410	General Controls Co 507	Refrigerating Specialties Co 409
American Coils Co 401	General Electric Co	Remington Arms Co 633-A
Ansul Chemical Co 417		Rochester Products Div.,
Armstrong Cork Co 611-12	Handy & Harman	General Motors Corp317
Arrow-Hart & Hegeman Electric	Heating, Piping &	Rubatex Div., Great American
Со	Air Conditioning 623	
Automatic Devices Div., American	Heating Publishers, Inc 621	Industries, Inc
Machine & Metals, Inc 218	Henry Valve Co 640	Schmidt Co., C
Avon Tube Div., Higbie Mfg. Co323	Highside Chemicals, Inc 326	Scotsman—Queen Products Div.,
	Hill, C. V., & Co., Inc608	
Bacharach Industrial Instrument	Holsclaw Bros., Inc	King-Seely Corp 636-7
Со	Howell Electric Motors Co 240	Shank, Cyrus, Co 615
Bally Case & Cooler Co 632		Sherer-Gillett Co 622
Barr Mfg. Co	Hubbell Corp	Skuttle Mfg. Co 633
Bell & Gossett Co	Imperial Brass Mfg. Co 748	Sporlan Valve Co
Bendix-Westinghouse Automotive	Imperial Damper Co 204	Sprague Electric Co 246
Air Brake Co	1 1 E W 6 (00	Standard Refrigeration Co 504
Betz Div., Bohn Aluminum &	Jackes-Evans Mfg. Co 609	Stiles-Karlsonite Corp 119
Brass Corp	Jamison Cold Storage Door Co 216	Stokes, F. J., Corp 631
	Jarrow Products, Inc 902	Superior Valve & Fittings Co 411
Beverage-Air Sales Co 605	Kaiser Aluminum & Chemical	Superior varie & Fittings Co 411
Binks Mfg. Co	Sales, Inc	Taylor-Burch Refrigeration
Bossman Controls Co 111		
Bundy Tubing Co 309	Keeney Publishing Co	Products Co 607
Byers, A. M., Co	Kenmore Machine Products, Inc532	Tecumseh Products Co 510-11
Calgon Co., Div. of Hagan	Kerotest Mfg. Co	Temprite Products Corp 420
Chemicals & Controls, Inc 904	Kesco Products Corp	Tenney Engineering, Inc 529-30
Cardox Div., Chemetron Corp 333	Kirsch Co	True Mfg. Co
	Koch Refrigerators, Inc 235	Tyler Refrigeration Corp 241-107
Carrier Corp	Kold-Hold Div., Tranter Mfg.,	Typhoon Air Conditioning Corp.
Century Electric Co 801	Inc	
Chemical Solvent Co 502	Koppers Co., Inc	
Chicago Reference Book Co 124		United Wire & Supply Corp 247
Clark Door Co., Inc917	Larkin Coils, Inc524-5-6	
Clayton Mark & Co	Lehigh Mfg. Co 616-17	Vibration Mountings Inc. 205
Coldin Cabinet Co	Lewin-Mathes Co 915-16	Vibration Mountings, Inc 205
Controls Co. of America 641-2	McCray Refrigerator Co., Inc 118	Viking Air Products, Div.,
Coolerator Div., McGraw-Edison	McIntire Co	National-U. S. Radiator Corp 221
Co	McQuay, Inc	Viking Copper Tube Co 404
Copeland Refrigeration Corp.	Madden Brass Products Co 117	Vilter Mfg. Co
		Virginia Smelting Co 528
	Magna-Kold Co	
Curtis Mfg. Co	Market Forge Co 125	Wabash Corp
Cutler-Hammer, Inc	Marley Co	Wagner Electric Corp 635
Davison Chemical Div., W. R.	Marlo Coil Co	Walton Laboratories, Inc
Grace & Co	Marsh Instrument Co 201	
Delco Products Div., General	Meier Electric & Machine	Warren Refrigerators
Motors Corp	Co., Inc	Watsco, Inc
	Melchior, Armstrong, Dessau Co418	Westinghouse Electric Corp 301
Detroit Controls Div. of	Metals & Controls Corp 601	White-Rodgers Co 501
American-Standard503	Milwaukee Electric Tool Corp 122	W-K-M Div. of ACF Industries,
Detroit Stamping Co 634		Inc
Domestic Engineering		
Dow Chemical Co 643	Minneapolis-Honeywell Regulator	Wolverine Tube, Div. of Calumet
Dow Chemical Co	Со	Wolverine Tube, Div. of Calumet
Dunham-Bush, Inc 422-3-4-5-6	-	Wolverine Tube, Div. of Calumet & Hecla, Inc
	Со	Wolverine Tube, Div. of Calumet

#### HIGHLIGHTS OF AIR CONDITIONING EXHIBITS

HERE ARE brief descriptions of those displays that will feature air conditioning equipment, products, or supplies (as reported by the respective manufacturers to the exposition management, and furnished to the publisher by presstime.) As some exhibitors of course could not complete the requested information in time for publication, the displays themselves should be checked for other air conditioning equipment, products, and supplies that will be shown. A list of all exhibitors and

their booth numbers — as furnished by the show management and complete at presstime —is published on the page facing the floor plan of the exposition.

If you turn to your right as you enter the Convention Hall and go to the far aisle, walking up and down the aisles lengthwise of the hall, you will find these descriptions of the displays in approximate order to minimize backtracking. For additional information, you are invited to inquire at Booth No. 623.

#### Copper and Copper Alloy Tubes . . Booths 915-16

Copper and copper alloy tubes for air conditioning and refrigeration, heat exchanger and condenser use.

Exhibitor: Lewin-Mathes Co., Div. of Cerro de Pasco Corp., 1111 Chouteau Ave., St. Louis 2.

#### Air Conditioning Units . . . . . . . . Booth 918

Multizone central station air conditioning unit, "Evntemp" steam coil and cut-away model, remote room air conditioning unit and cut-away model.

Exhibitor: Marlo Coil Co., 7100 S. Grand Ave., St. Louis 11.

#### Tools, Valves, Fittings . . . . . . . . . Booth 748

Universal piercing valve for canned refrigerants, double-action tube bender, charging port for hermetic units, flaring tool that also burnishes, sizing tools, production flaring tools. Also, refrigerant hose and re-usable couplings, flared tube fittings, driers, "Magic Eye" liquid indicators, "Diamond" valves, tube cutters, flaring tools, tube benders, charging and testing units, charging hose, hermetic piercing valves, etc.

Exhibitor: The Imperial Brass Mfg. Co., 6300 W. Howard St., Chicago 48.

#### Switches, Starters ..... Booths 746-47

New oiltight pressure switch operating at pressures up to 5000 psi, and a new temperature switch with lower differentials and new bellows designed to provide "ten times longer life." Also, new developments in control relays, manual and magnetic starters for both full and reduced voltage applications, pilot devices and accessories.

Exhibitor: Allen-Bradley Co., 136 W. Greenfield Ave., Milwaukee 4.

#### Air Conditioning Units . . . . . . . Booths 708-9

Air conditioning units featuring modular construction for flexibility in arrangement in sizes from 1200 to 29,000 cfm; "Dri-Fan" factory-assembled evaporative condensers in capacities up to 233 nominal tons; electric defrost unit coolers; "Vapomatic" demonstrator

Exhibitor: Recold Corp., 7250 E. Slauson Ave., Los Angeles 22.

#### Engine Driven Compressors . . . . . . . Booth 626

Engine driven refrigeration compressors, 1 through 6 tons; condensing units; engines; portable and mobile electric generating plants.

Exhibitor: D. W. Onan & Sons Inc., University Ave., S.E. at 25th, Minneapolis 14.

#### Instruments, Recorders . . . . . . . . Booth 624

"Floret" air velocity indicator, "Tempscribe" two pen temperature-operation recorders, "Monoxor" quantitative CO analyzer, sling psychrometers, air filter gages, air filter service switch. Also, bi-metal and remote temperature recorders. "Florite" air velocity meters, "Fyrite" testing kits, mercury and dial thermometers, gas pressure manometer.

Exhibitor: Bacharach Industrial Instrument Co., 200 N. Braddock Ave., Pittsburgh 8.

#### High Vacuum Pumps . . . . . . . . Booth 631

Compound high vacuum pumps for dehydration of sealed systems before introducing refrigerants. Also, high vacuum gage. Exhibitor: F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20.

#### Humidifier, Air Filters ..... Booth 633

New aerosol-atomizing humidifier for domestic, commercial and industrial applications. Also, permanent, washable air filters for furnaces, room coolers, and central air conditioning systems.

Exhibitor: Skuttle Mfg. Co., Milford, Mich.

#### Publications ..... Booth 623

"Heating, Piping & Air Conditioning," magazine for consulting engineers, mechanical (heating, piping, and air conditioning) contractors; engineers with plants and big buildings. "American Artisan . . . The Magazine of Central Residential Air Conditioning, Warm Air Heating, and Sheet Metal Contracting," "Air Conditioning" newsletter; reprint books; marketing information.

Exhibitor: Keeney Publishing Co., 6 N. Michigan Ave., Chicago 2.

#### Stud Drivers ..... Booth 633-A

Stud driver equipment.

Exhibitor: Remington Arms Co., Inc., Bridgeport 2, Conn.

#### Blower Housings, Stampings . . . . . . . Booth 634

"De-Sta-Co" blower housings, flapper valves for compressors, special plates and flanges, variety of unique stampings.

Exhibitor: Detroit Stamping Co., 350 Midland Ave., Detroit 3.

#### Compressor Rack Kits ..... Booth 619

New "AIM Brand" slotted single compressor rack kits, which include precisely cut lengths of galvanized cold-rolled steel slotted angle for each type of rack, diagram and instructions, wooden supports, nuts, bolts and lock washers. Also slotted angle for custom-built racks, mounts and supports for control boards, piping, ducts and cooling towers.

Exhibitor: Acme Steel Co., Fabricated Materials Div., 135th

& Perry Ave., Chicago 27.

#### Starters, Motors ..... Booth 635

Demonstration unit showing operation of four-step increment (part winding) starter for use with squirrel-cage motors to obtain low inrush of current at start; demonstration unit showing quiet operation of a 10 hp resilient mounted squirrel cage motor. Also, standard fractional and integral motors, jet pump and belted drive fan motors, single- and three-phase hermetic motors.

Exhibitor: Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 33

#### Air Curtain, Condensing Units . . . Booths 616-17

Air curtain, hermetic condensing units, belt-driven condensing units, receivers and receiver-condensers.

Exhibitor: Lehigh Mfg. Co., 1500 Lehigh Dr., Easton, Pa.

#### Relief and Other Valves ..... Booth 615

Ammonia relief valves, liquid oxygen valves, shut-off valves, expansion valves, check valves, purge valves, three-way valves, 300 lb malleable iron fittings.

Exhibitor: Cyrus Shank Co., 4646 W. 12th Pl., Chicago 50.

#### Defrost Controls ..... Booth 638

Defrost control with adjustable fail safe protection, time initiated-pressure terminated; defrost control with adjustable fan delay for hot gas, electric heat and water spray defrosting.

Exhibitor: Paragon Electric Co., 1600 12th St., Two Rivers, Wis.

#### Magnetic Starters, Contactors . . . . . Booth 613

New "Class 41" magnetic contactor designed for air conditioning and refrigeration service, rated 20, 30 and 40 amp in 2, 3 and 4 poles, and available as open type or in general purpose enclosures. New design magnetic starters, rated 20, 30, 35 and 50 amp, feature all front removable components, dual voltage coils reconnectable in the field, trip-free thermal overload units with trip indicator. Also, magnetic starters and contactors through 400 hp, 550 v and related pilot devices.

Exhibitor: Furnas Electric Co., 1000 McKee St., Batavia, Ill.

#### Insulation Finish . . . . . . . . . Booths 611-12

Newly developed highly flexible plastic finish designed for "Armaflex" pipe insulation. Also, pipe insulation, sheet insulation, "Armalite" insulation, "Insulcolor," "Monoplast," "Plasticork," adhesives and sundry materials.

Exhibitor: Armstrong Cork Co., Insulation Div., Lancaster, Pa.

#### Driers, Solder, Flux ..... Booth 610

New molecular sieve driers with large screen areas and brass shells; silver solder flux in plastic bottle; heavy duty driers; capillary tubes; strainers and driers; piercing valves; silver solder and flux; cap tube drier; strainer combinations.

Exhibitor: Wabash Corp., 2300 S. Western Ave., Chicago 8.

#### Valves, Controls ..... Booth 609

New three-way valve for fan-coil unit water control, new control package for fan-coil units. Also, solenoid valves for refrigerants (liquid, suction and hot gas), water, air, light oil, other fluids.

Exhibitor: Jackes-Evans Mfg. Co., Controls Div., 4427 Geraldine Ave., St. Louis 15.

#### Expansion Valves, Solenoids . . . . Booths 641-2

"Flat-Top" thermostatic expansion valve designed for use in heating and air conditioning units; new "Trap-Dri" with silica gel and molecular sieve; demonstration units of hot gas defrost operations and applications of pressure regulating valves for room coolers. Also, "A-P" expansion valves, solenoid valves, and regulating valves; "Redmond" motors and blowers.

Exhibitor: Controls Co. of America, 2450 N. 32nd St., Milwaukee.

#### Insulation, Pipe Covering ..... Booth 643

Display will be devoted to use of "Styrofoam" in low temperature insulation and pipe covering, and will feature the exhibitor's "approved contractor" program which is aimed to assure quality installation and quality insulation.

Exhibitor: The Dow Chemical Co., Midland, Mich.

#### Lubricated Plug Valves ..... Booth 604

Lubricated plug valves.

Exhibitor: W-K-M Div. of ACF Industries, Inc., P. O. Box 2217, Houston 1.

#### Unit Air Conditioner ..... Booth 644

New 15 hp unit air conditioner arranged with bypass damper to provide humidity control. Also, "Eclipse" compound or twostage compressor, models of "Prestfin" and "Spiral-fin" coils, valves, fittings, machine parts.

Exhibitor: Frick Co., Waynesboro, Pa.

#### Protective Devices, Controls ..... Booth 601

Protective devices for hermetic compressors, of enclosed thermostat design mounted on the windings inside the hermetic enclosure. Also, "Klixon" service parts, starting and protective devices for compressors, controls made by the Spencer Products Group, and metals and materials made by the General Plate Group.

Exhibitor: Metals & Controls Div., Texas Instruments, Inc., 34 Forest St., Attleboro, Mass.

#### Controls . . . . . . . . . . . . Booth 501

Complete line of automatic controls for air conditioning and refrigeration, including thermostats, temperature and pressure controls, and air conditioning control panels.

Exhibitor: White-Rodgers Co., 1209 Cass Ave., St. Louis 6.

#### Refrigerants ..... Booth 534

"Genetron" refrigerants.

Exhibitor: General Chemical Div., Allied Chemical Corp., 40 Rector St., New York 6.

#### Expansion Valve ..... Booth 503

New expansion valve with inspection window. Also, solenoids, other expansion valves, air conditioning controls.

Exhibitor: Detroit Controls Div. of American-Standard, 5900 Trumbull Ave., Detroit 8.

#### Driers, Heat Exchangers ..... Booth 532

"Little Giant" all-purpose molecular sieve driers, heat exchangers, steel accumulators. Also, OEM driers, strainers, accumulators, capillary assemblies, etc., and driers, strainers and capillary assemblies for servicemen, including "Kap-Kit" and other specialty items.

Exhibitor: Kenmore Machine Products, Inc., 15 Depew Ave., Lyons, N.Y.

#### Receivers, Condensers . . . . . . . . Booth 504

Heat pump receivers, booster receivers, F.F. receivers, large capacity shell and tube condensers. Also, vertical and horizontal receivers, shell and coil condensers.

Exhibitor: Standard Refrigeration Co., 3535 Fillmore, Chicago.

#### Finned Coils, Unit Coolers . . . . . Booths 529-30

New finned coils and unit coolers. Also, exhibitor's complete line.

Exhibitor: Tenney Engineering, Inc., 1090 Springfield Rd., Union, N.J.

#### Refrigerants, Chemicals, Oils ..... Booth 528

Refrigerants, water chemicals, insulation and sealing materials, refrigeration oils.

Exhibitor: Virginia Smelting Co., West Norfolk, Va.

#### Coils, Cooling Tower . . . . . . . Booths 524-5-6

Air conditioning coils, cooling tower, remote air cooled condenser, unit coolers.

Exhibitor: Larkin Coils, Inc., 519 Memorial Dr., S.E., Altanta.

#### Compressors ..... Booths 510-11

New "CL30" 3 hp, 2-pole air conditioning compressor featuring a built-in anti-slugging device and internal overload. Also, cut-aways and representative models of air conditioning line of pancake compressors and special heat pump compressors.

Exhibitor: Tecumseh Products Co., Tecumseh, Mich.

#### Controls, Control Center ..... Booth 512

Control panels, heat pump sequencing devices, residential weather station control center, heating and cooling thermostats, dirty filter indicator.

Exhibitor: Minneapolis-Honeywell Regulator Co., 2747 Fourth Ave., S., Minneapolis 8.

#### Solenoid and Other Valves . . . . . . Booth 523

New line of high pressure solenoid valves for refrigerant 22, recent improvements in full line of solenoid valves, developments in new change-over valves, cut-aways and animation of thermo and solenoid valves. Also, latest designs in series for direct expansion, suction pressure regulators together with new version of pilot control including evaporator pressure regulators. Venturi flow distributors. Thermo expansion valves with and without pressure limiting feature.

Exhibitor: Alco Valve Co., 865 Kingsland Ave., St. Louis 30.

#### Air Cooled Condensers . . . . . . Booths 513-14

Line of air cooled condensers, ranging in nominal sizes from 1 to 60 tons, these ratings being based on a 20 F difference between entering air and condensing temperature. Also, floor type industrial units, unit coolers.

Exhibitor: Refrigeration Appliances, Inc., 923 W. Lake St., Chicago 7.

#### Copper Tube ..... Booth 519

New packaging concept for copper refrigeration service tube for wholesaler distributors, comprising a round carton with center hole to facilitate handling and storing and that can be used as a reel. Also, long-length copper coils; "Tap/Trap" air chamber; "Trufin" integrally finned tube; "Capilator" capillary tube; extruded and drawn aluminum tube; commercial copper tubing; "Spun End Process" for strainers, driers, accumulators; other fabricated parts.

Exhibitor: Wolverine Tube, Div. of Calumet & Hecla, Inc., 17200 Southfield Rd., Allen Park, Mich.

#### Moisture Indicators, Refrigerants . . . . Booth 417

New "Super Dry-Eye" moisture indicators, "Ucon" brand refrigerants. Also, driers, drier manifolds, receiver driers and receiver moisture indicators, sight glasses, oil, packaged refriger-

Exhibitor: Ansul Chemical Co., Marinette, Wisc.

#### Roof-Top Air Conditioning Unit . . . . Booth 418

"Melco" roof-top air conditioning unit providing heating and cooling for single-story buildings. Also, "Compact-A-Metic" compressor rack units.

Exhibitor: Melchior, Armstrong, Dessau Co., 730 Grand Ave., Ridgefield, N.J.

#### Expansion and Solenoid Valves . . . . . Booth 421

Thermostatic expansion valves, solenoid valves, refrigerant distributors, "Catch-All" filter-driers, "See-All" moisture and liquid indicators, "Level-Master" for liquid level control.

Exhibitor: Sporlan Valve Co., 7525 Sussex Ave., St. Louis 17.

#### Aluminum Coils, Sheets ..... Booth 412

An all aluminum air conditioning coil; finished parts used in air conditioning and refrigeration and made by customers of the exhibitor; new high-brilliancy alloy 5457, "Satin-Tex" sheet, and patterned sheet.

Exhibitor: Kaiser Aluminum & Chemical Sales Inc., 1924 Broadway, Oakland, Calif.

#### Valves, Sight Glasses, Accessories . . . Booth 411

Valves, sight glasses, heat exchangers, driers, filters, strainers, manifolds, fittings, accessories.

Exhibitor: Superior Valve and Fittings Co., 1509 W. Liberty Ave., Pittsburgh 26.

#### Flexible Metal Tubing ..... Booth 410

New "AX" large diameter flexible metal corrugated tubing assemblies designed to handle axial and lateral movements while conveying large volumes of liquids or gases, and flexible tin-bronze "Anaconda" vibration eliminators for high pressure applications. Also, restrictor tubes; long coils of capillary tubes; general display of small diameter tubing; flexible metal hose assemblies of monel, stainless steel, steel and aluminum; as well as "Sealtite" conduit and "Flexpipe."

Exhibitor: The American Brass Co., Waterbury, Conn.

#### Water Regulators, Solenoid Valves . . . Booth 409

Combination R-12/R-22 water regulators; three-way water regulators, ½ to 4 in.; temperature actuated water regulators; motorized water regulators; temperature compensating back pressure regulators. Also, complete line of solenoid valves and back pressure regulators, including cut-aways and operating models.

Exhibitor: Refrigerating Specialties Co., 3004 W. Lexington Ave., Chicago 12.

#### Fin and Refrigeration Tubing . . . . . Booth 408

"Readi-Fin" integral fin tubing, "Readi-Pak't" refrigeration tubing.

Exhibitor: Reading Tube Corp., 2301 Empire State Bldg., New York 1.

#### Conditioners, Compressors . . Booths 422-3-4-5-6

Direct drive condensing units and compressors, industrial hermetic units and motor-compressors, 20 hp "Brunnermetic" compressors, rooftop conditioners, "Plasti-Deck" cooling towers, low silhouette blower condenser, blow-through evaporative condensers. Also, shell and tube inner fin condensers, air handling units, air cooled condensers, various types of air conditioners, coils, centrifugal pumps, specialties and circulators, other products.

Exhibitor: Dunham-Bush, Inc. (including Brunner Div. and Heat-X subsidiary), 179 South St., West Hartford, Conn.

#### Air Conditioners, Compressors . . . . Booth 407

New "V-line" compressor, packaged liquid chiller using new compressor, 25 ton air or water cooled package unit, fan coil room air conditioner, 10 ton ceiling hung blower coil unit, 10 ton air cooled condensing unit, new electric furnace humidifier, new complete winter air conditioning unit, self-contained heat pump unit, split system heat pump unit, humidity control air conditioner, remote coil and blower unit, air cooled condensing unit.

Exhibitor: Worthington Corp., Mueller Climatrol and AC&R Divs., Worthington Ave., Harrison, N. J.

#### Driers, Liquid Indicators ..... Booth 406

Large capacity driers, angle refillable driers, "Vuemaster" moisture and liquid indicators. Also, refrigeration valves, copper tube, liquid indicators, heat exchangers, accessories.

Exhibitor: Mueller Brass Co., 1925 Lapeer Ave., Port Huron, Mich.

#### Air Conditioners, Coils ..... Booth 427-8

Ceiling mounted air conditioners, floor mounted air conditioners, residential air conditioning evaporators, OEM air conditioning and refrigeration coils, vertical air flow air cooled condenser, unit coolers, defrost systems.

Exhibitor: McQuay, Inc., 1600 Broadway St., N.E., Minneapolis.

#### Seamless Copper Tubes . . . . . . . . Booth 404

Seamless copper tubes specially tempered for air conditioning and refrigeration applications, and seamless copper tubes in continuous lengths up to 1500 ft.

Exhibitor: Viking Copper Tube Co., 16700 St. Clair Ave., Cleveland 10.

#### Refrigerant Dessicants . . . . . . . . Booth 403

New "Microtraps" refrigerant dessicant, a miscoselective adsorbent material developed especially for removing low concentrations of moisture from refrigerants. Also, silica gel high capacity refrigerant dessicants.

Exhibitor: W. R. Grace & Co., Davison Chemical Div., Baltimore 3.

#### Air Conditioning, Furnaces, Coils . . . . Booth 402

New "Luxaire" air handling blower and cooling coil units with capacities of 34,000 and 55,300 Btu per hr, new counterflow add-on cooling coils with capacities of 36,000 and 56,500 Btu, new line of four gas fired horizontal furnaces with 80,000 to 140,000 Btu per hr inputs and approved for high air deliveries and static pressures for year 'round air conditioning installations, new factory assembled and wired upflow gas fired winter air conditioning units with 175,000 and 200,000 Btu per hr inputs. Also, air cooled condensing units, upflow and horizontal cooling coils, gas and oil fired winter air conditioning units, gas fired unit heaters.

Exhibitor: The C. A. Olsen Mfg. Co., Elyria, Ohio.

#### Air Conditioning, Furnaces, Coils . . . Booth 402

New "Moncrief" blower-coil air handling units with 34,000 and 55,300 Btu capacities; new add-on counterflow cooling coils with 36,000 and 56,500 Btu per hr capacities; new gas fired horizontal furnaces with 80,000, 100,000, 120,000, and 140,000 Btu per hr inputs; new factory assembled and wired winter air conditioners with 175,000 and 200,000 Btu inputs. Also, plenum type and duct type evaporator coils, air cooled condenser-compressor units, gas and oil winter air conditioners, gas unit heaters.

Exhibitor: The Henry Furnace Co., Medina, Ohio.

#### Air Conditioners, Chillers . . . . . . Booth 401

New roof mounted air cooled air conditioners, in range of sizes 5 through 20 hp, comprising air cooled condensing unit, air handling unit, and gas-fired duct furnace assembled in one cabinet. New air cooled, self contained packaged liquid chillers, sizes 3 through 20 hp, fully assembled, factory charged and wired. Also, heat pumps, air and water cooled condensing units, air cooled residential condensing units, air cooled condensers and cooling towers.

Exhibitor: American Coils Co., Route 524, Lakewood Rd., Farmingdale, N.J.

#### Refrigerants ..... Booth 432

"Freon" refrigerants.

Exhibitor: E. I. du Pont de Nemours & Co., Inc., 10th and Orange Sts., Wilmington, Del.

#### Water Treatment . . . . . . . . . Booth 904

"Biocide," condenser cleaner, "Micromet" plates, scale remover, algaecide, powdered acid, liquid ice machine cleaner, ice machine treatment, "Banox."

Exhibitor: Calgon Co., Div. of Hagan Chemicals & Controls, Inc., Hagan Bldg., Pittsburgh 30.

#### Dehumidifiers ..... Booth 302

Dehumidifiers, water coolers.

Exhibitor: Ebco Mfg. Co., 265 N. Hamilton Rd., Columbus 13, Ohio.

#### Condensing Units, Heating Units . . . . Booth 303

"Airvec" convection-cooled condensing units for motels and hotels, zone controlled packaged heating units, tube-in-tube chiller units. Also, motorized zone control valves, coaxial water cooled tube-in-tube condensers.

Exhibitor: Edwards Engineering Corp., 101 Alexander Ave., Pompton Plains, N. J.

#### Tubing, Bellows, Valves . . . . . . . . Booth 304

Copper refrigeration and air conditioning tubing, capillary and other precision drawn ferrous and nonferrous metal tubing, metal bellows and expansion compensators, valves, plain and anodized aluminum fin stock, continuously anodized aluminum strip in coils.

Exhibitor: Fromson Orban Co., Inc., 261 Madison Ave., New York 16.

#### Steel Tubing ..... Booth 334

Steel tubing, tested electronically and hydraulically by "Mark-Test." Also, examples of applications.

Exhibitor: Clayton Mark & Co., 1900 Dempster St., Evanston,

#### Air Conditioners, Chillers . . . . . . . Booth 306

"Spotaire" fan-coil units for horizontal and for vertical air flow, "Capitolaire" water chiller, 1960 model of "Capitolaire" packaged air conditioners, "National-U. S." water chiller. Also, heating-cooling operating display featuring boiler, chiller, fan-coil unit and controls.

Exhibitor: Heating & Air Conditioning Div., National-U. S. Radiator Corp., 944 Ash St., Johnstown, Pa.

#### Motor-Compressors ..... Booth 307

"Ovaline" air conditioning motor-compressors ranging from 5000 to 15,000 Btu per hr. Also, 3 hp and 4 hp air conditioning motor-compressors, and hermetic condensing units.

Exhibitor: Bendix-Westinghouse Automotive Air Brake Co., 950 E. Virginia St., Evansville 11, Ind.

#### Valves, Fittings, Accessories . . . . . . . Booth 308

Valves, manifolds, compressor valves, liquid indicators, sight glasses, fittings, and accessories.

Exhibitor: Kerotest Mfg. Co., 2525 Liberty Ave., Pittsburgh 22.

#### Evaporators, Condensers ..... Booths 327-8

Aluminum and copper "Roll-Bond" evaporators and condensers. Exhibitor: Roll-Bond Products, Metals Div., Olin Mathieson Chemical Corp., East Alton, Ill.

#### Dehydrant, Leak Detector ..... Booth 326

"Thawzone" fluid dehydrant, "Trace" liquid leak detector, "Leak Lock" joint sealing compound.

Exhibitor: Highside Chemicals Inc., 10 Colfax Ave., Clifton, N. J.

#### Relays, Controllers ..... Booth 325

New motor starting relays; complete line of air conditioning magnetic controllers, including relays and contactors; potential motor starting relays; power relays; general purpose multi-pole switching relays; time delay relays; hermetic overload protectors; 3 hp compressor controller.

Exhibitor: R-B-M Controls Div., Essex Wire Corp., 131 Godfrey St., Logansport, Ind.

#### Compressors, Condensing Units .... Booth 324

Refrigerant compressors, package liquid coolers, motor compressors, condensing units, heat transfer equipment, centrifugal pumps, air conditioning and refrigeration components.

Exhibitor: Bell & Gossett Co., Morton Grove, Ill.

#### Controls . . . . . . . . . . . . . . Booth 312

Control with high electrical rating for air conditioning and refrigeration applications; controls with wide differentials and fixed setting arrangement for air conditioning and refrigeration applications; sequence timer for defrosting; reversing valves; de-icer controls for year 'round comfort with dehumidification, cooling and heating; commercial controls.

Exhibitor: Ranco Inc., 601 W. 5th Ave., Columbus 1, Ohio.

#### Steel Tubing ..... Booth 323

"Fusionbrazed" steel tubing now being made by exhibitor's Fulton Tubing Co. Div. and available in sizes from 3/16 to 3/8 in. OD inclusive. Tubing is double wrapped hydrogen brazed with copper finish on ID and OD, is also available with a terne coated OD for corrosion resistance. Samples of fabricated tubular assemblies and electrical heating sheathed type elements made from steel tubing will also be displayed.

Exhibitor: Avon Tube Div., Higbie Mfg. Co., 4th and Water Sts., Rochester, Mich.

#### Polystyrene ..... Booth 319

"Dylite" expandable polystyrene for use in air conditioning and

Exhibitor: Koppers Co., Inc., Plastics Div., Koppers Bldg., Pittsburgh 19.

#### Evaporative Condenser ..... Booth 318

Blow-through type evaporative condenser, 55 ton nominal capacity, cut apart to emphasize constructional features. Also, installation photos.

Exhibitor: The Vilter Mfg. Co., 2217 S. First St., Milwaukee 7.

#### Steel Tubing ..... Booth 317

A complete automotive air conditioning condenser featuring a flattened serpentine of steel tubing. Also, various other applications of steel tubing.

Exhibitor: Rochester Products Div., General Motors Corp., 1000 Lexington Ave., Rochester 3, N. Y.

#### Electric Motors ..... Booth 801

Complete line of re-rated motors, 1/20 to 150 hp.

Exhibitor: Century Electric Co., 1806 Pine St., St. Louis 3.

#### Humidifiers . . . . . . . . . . Booth 224

Space and in-duct humidifiers for industrial plant applications; duct type and portable humidifiers for residential use. Also, humidity controls and indicators.

Exhibitor: Walton Laboratories, Inc., 1186 Grove St., Irvington 11, N. J.

#### Air Conditioning Units . . . . . . . . Booth 223

Air conditioning unit available with steam, water and direct expansion coils; residential evaporators for installation above or below a furnace, and for duct installation; suction line heat exchangers with straight through connection; unit coolers; product coolers; air cooled condenser with "Sensitizer" for winter operation.

Exhibitor: Bohn Aluminum & Brass Corp., Betz Div., 1625 E. Voorhees St., Danville, Ill.

#### Balancer . . . . . . . . . . . . Booth 221

Jet room balancer.

Exhibitor: Viking Air Products, 5601 Walworth Ave., Cleveland.

#### Sight Glasses ..... Booth 226

New moisture-reactor "Liquid Eye" indicators. Also, standard line of "Liquid Eye" indicators and other components.

Exhibitor: Allin Mfg. Co., 410 N. Hermitage Ave., Chicago.

#### Motor Controls . . . . . . . . . . . Booth 228

Definite purpose contactors (25 amp, 2 and 3 pole) for use on 2, 3 and 5 hp inherently protected hermetically sealed compressor motors, and designed to meet the needs of 85 percent of the residential central air conditioning market. Definite purpose 40 amp contactors for use on inherently hermetically sealed motors. Fused pull-outs (2 and 3 pole, 30 and 60 amp) for fused protection. Also, 30 and 50 amp air conditioning and refrigeration starters and contacts, manual magnetics, starters, pushbutton controls.

Exhibitor: Arrow-Hart & Hegeman Electric Co., 103 Hawthorn St., Hartford 6, Conn.

#### Condensers . . . . . . . . . . . . Booth 230

Refrigeration condensers.

Exhibitor: Kirsch Co., Refrigeration Products, 309 N. Prospect Ave., Sturgis, Mich.

#### Fan Coil Unit, Chillers ..... Booth 233

"Conceal-X" heating and cooling fan coil unit, water chillers, universal "K" surface, baseboard coils, fin coils, unit coolers.

Exhibitor: Peerless of America, Inc., 5800 N. Pulaski Rd., Chicago 46.

#### Self-Sealing Couplings . . . . . . . . Booth 234

Self-sealing couplings.

Exhibitor: Aeroquip Corp., 300 S. East Ave., Jackson, Mich.

#### Leak Detector, Motors ..... Booths 212-15

New leak detector for highly contaminated atmospheres, new standard leak detector, new leak detector with proportioning probe. Also, display of hermetic motors, and complete line of capacitors and fractional hp motors for the air conditioning industry.

Exhibitor: General Electric Co., Schenectady, N. Y.

#### Fittings and Assemblies . . . . . . . . Booth 236

Wrought fittings, headers and manifolds, return bends, condenser parts, tube fittings, strainers, assemblies, spun parts, custom bent tubes, accumulators.

Exhibitor: Elkhart Products Corp., 1255 Oak St., Elkhart, Ind.

#### Wrought Iron . . . . . . . . . . . Booth 237

New "Mn" wrought iron, a specialty alloy containing approximately 1 percent manganese and having improved impact resistance at subzero temperatures, designed for service where brittle failure poses engineering and design problems. Also "4-D" wrought iron and plate, having about 25 percent more corrosion resistance than standard wrought iron. Visitors to booth will try to guess the life of a section of wrought iron pipe taken from actual service. Exhibitor: A. M. Byers Co., Clark Bldg., Pittsburgh 30.

#### Compressor Opener . . . . . . . . Booth 238

Hermetic compressor opener designed to automatically open any hermetic compressor up to 20 in. diameter, regardless of position of weld or shape of compressor.

Exhibitor: Frankell Mfg. Co., Inc., 862 Newark Ave., Jersey City 6, N. J.

#### Tubing Insulation . . . . . . . . . Booth 211

Closed cell tubing insulation and various extruded shapes and

Exhibitor: Rubatex, Div. of Great American Industries, Inc., Bedford, Va.

#### Air Conditioners, Chillers ..... Booth 209

Packaged air conditioners, through 60 tons; packaged liquid chillers, through 125 tons; air and water cooled condensing units. Exhibitor: Curtis Mfg. Co., Refrigeration Div., 1905 Kienlen Ave., St. Louis 33.

#### Electric Motors ..... Booth 240

Integral and fractional polyphase motors with inherent thermal protection; fractional multi-speed blower units, 1800/1200 rpm, for use with heating and cooling coils; resilient mounted 2 hp motor. Also, standard line of integrals to 300 hp and standard line of fractionals.

Exhibitors: Howell Electric Motors Co., Howell, Mich.; Kingston-Conley, Inc., Plainfield, N. J.; Ohio Electric Mfg. Co., Maple Heights, Ohio.

#### Receivers, Filter-Driers . . . . . . . Booth 208

New receivers, "Bull Dog" filter-driers featuring zoned filtration, new suction accumulators, capillary and drier assemblies. Also, heat exchanges, mufflers, accumulator-driers, strainers, fabricated tubes, receiver-driers.

Exhibitor: Refrigeration Research, Inc., Brighton, Mich.

#### Cooling Towers . . . . . . . . . . . . Booth 242

"Watertemp" cooling towers in capacity range from 5 to 60 tons, and new heavy duty "Watertemp" construction, capacity range 80 to 300 tons. Also, complete line of industrial nozzles for industry-wide applications.

Exhibitor: Binks Mfg. Co., 3100 W. Carroll Ave., Chicago 12.

#### Compressor Analyzer, Testing . . . . Booths 206-7

Six new instruments for hermetic compressor analysis and electrical testing and demonstration of high vacuum pump for dehydrating, degassing and leak testing systems. Also, portable charging stations, panels and cylinders; psychrometers and thermometers; calculators; thermostatic control tester; electronic sound tracer; refrigerant and vacuum hoses and quick couplers; air meters; high and low vacuum pumps.

Exhibitor: Airserco Mfg. Co., Inc., 435 Melwood Ave., Pittsburgh 13.

#### Dampers, Grilles ..... Booth 204

Fire damper that carries Underwriters' Laboratories label, new "Ful-Flo" grille used for exhausts and outdoor air intakes. Also, parallel and opposed blade dampers, fire dampers, extruded and adjustable louvers, door louvers, shutters.

Exhibitor: Imperial Damper Co., 664 Edgecombe Ave., New York 32

#### Fans, Electric Heating . . . . . . . Booths 202-03

New six blade, one piece condenser fan and slinger ring; new four blade, heavy duty fan, 20 to 42 in. diameters, for package and split system air conditioners, cooling tower and attic fan applications; line of domestic electric heating equipment, including baseboard, wall, portable and bathroom heaters, and ceiling cable. Exhibitor: Meier Electric, 3525 E. Washington St., Indianapolis.

#### Capacitors ..... Booth 246

New, improved terminals for motor-start and motor-run capacitors, "Mike-O-Meter" motor capacitor tester, motor-start and motor-run capacitors, "Koolpak" capacitor assemblies, adequate wiring analyzer.

Exhibitor: Sprague Electric Co., Marshall St., North Adams, Mass.

#### Tube, Brazing Alloy, Wire ..... Booth 247

Drawn copper and copper base alloy tube, straight and coiled; integral fin-tube, straight and formed; drawn aluminum, straight and coiled, plain and anodized; low temperature brazing alloy; drawn copper, copper alloy, and aluminum wire.

Exhibitor: United Wire & Supply Corp., 1497 Elmwood Ave., Providence, R. I.

#### Valves, Instruments . . . . . . . . . Booth 201

New line of solenoid valves, piping and duct thermometers, "Master Test" test gages. Also, "Serviceman" line of testing gages and thermometers, pressure and temperature operated water regulating valves, gages, needle valves.

Exhibitor: Marsh Instrument Co., Div. of Colorado Oil and Gas Corp., 3501 W. Howard St., Skokie, Ill.

#### Electric Heating Elements . . . . . . . Booth 101

Electric heating elements for the air conditioning and refrigeration industries.

Exhibitor: Electro-Therm, Inc., 931 Selim Rd., Silver Spring, Md.

#### Condensers, Cooling Towers . . . . Booths 149-50

"DriCooler" air cooled refrigerant condensers, now being produced in capacities nominally rated from 15 through 100 tons, displayed with low temperature control features; initial announcement of evaporative condenser of new type. Also, packaged cooling towers of three basic types — "Aquatower," "AquaCooler," and "Permatower."

Exhibitor: The Marley Co., 222 W. Gregory, Kansas City 14, Mo.

#### Motor-Compressors ..... Booths 139-40-1-2-3

New 4 and 6 cylinder, 7½ hp low temperature through 25 hp high temperature, "Copelametic" motor-compressors; 2½, 3, 3½, 4 and 5 hp "Copelaweld" motor-compressors; ½, 1/5, ¼ and 1/3 hp "Copelaweld" motor-compressors and condensing units; air cooled and water cooled "Copelametic" condensing units of new compact design; belt-driven condensing units.

Exhibitor: Copeland Refrigeration Corp., Sidney, Ohio.

#### Tube Benders . . . . . . . . . . Booth 114

"Handy" tube benders for copper, steel and iron tubing or pipe. Exhibitor: Holsclaw Bros., Inc., 408 N. Willow Rd., Evansville, Ind.

#### Filter-Driers, Accessories . . . . . . Booths 115-16

New line of filter-driers, aluminum filter-driers for aircraft service, special gas driers for high pressure service, electronic gas detoxifiers, oxygen filters, storage tank indicating dry air breathers, instrument air dehydrators. Also, hermetic liquid indicators, liquid and suction filters, water regulating valves, charging hoses, tube clamps, mounting straps, flexible pull-out hoses.

Exhibitor: The McIntire Co., Okner Pkwy., Livingston, N. J.

#### Charging, Testing Unit ..... Booth 117

Recently introduced charging and testing unit. Also, tube piercing valves, charging lines, driers, strainers, capillary tubing, swivel tees, and flare tube fittings.

Exhibitor: Madden Brass Products Co., 700 Sheffer Rd., Aurora, Ill.

#### Water Treatment . . . . . . . . . Booth 119

New model of feeder, other larger models, related chemicals. Exhibitor: Stiles Karlsonite Corp., 1550 Grand Ave., Waukegan, III.

#### Leak Detector . . . . . . . . . . . Booth 120

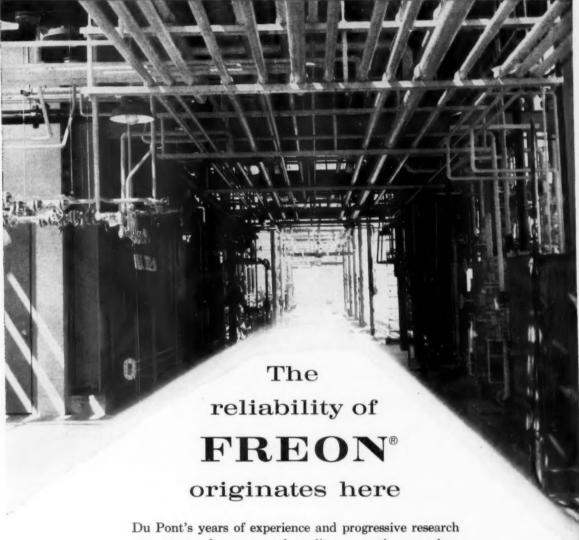
Electronic leak detector will be demonstrated testing for leaks on a refrigeration unit. Also, a display of general interest featuring old-time catalogs.

Exhibitor: The Harry Alter Co., Inc., 1721 S. Wabash Ave., Chicago 16.

#### Electric Shear, Tools ..... Booth 122

Electric shear with capacity up to 16 gage in steel, and 17 gage in stainless, which will give minimum left-hand radius of ½ in. and minimum right-hand radius of 1 in.; "Dymo" line of diamond drilling equipment for holes up to 6 in. diameter will be introduced; new line of circular saws will be featured. Also, "Sawzall" and blades, right angle drills, electric hammers, sander-grinders, screw drivers, chain saws, generators, and polishers.

Exhibitor: Milwaukee Electric Tool Corp., 5316 W. State St., Milwaukee 8.



Du Pont's years of experience and progressive research assure you of unsurpassed quality every time you buy Freon\* refrigerants. Factory-sealed cylinders guarantee purity. Insist on genuine "Freon" refrigerants—the gold hood cap identifies its premium quality.



BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.), "Freon" Products Division, Wilmington 98, Delaware





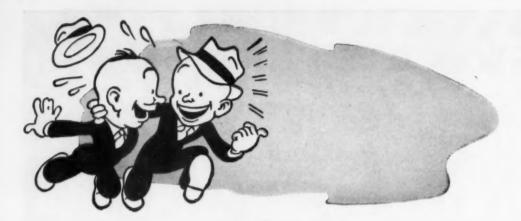
LABORATORY CONTROL



UNLIMITED SUPPLY



\*Freon and combinations of Freon- or F- followed by numerals are Du Pont's registered trademarks for its fluorinated hydrocarbon refrigerants.



### **Heat Pump Check-List Doubles as Sales Tool**

WORK SHEETS ARE MOST HELPFUL in selecting, installing and adjusting all types of mechanical equipment. Filled in, they also provide accurate records of work performed. The accompanying check-list is a reproduction of one supplied to dealer-contractors serving the Los Angeles area by the Southern California Edison Co. to facilitate the work involved in a heat pump installation.

Dealer-contractors use this checklist as a sales tool to show prospects the essential steps to a satisfactory installation, and point out why short cuts or omission of certain items will result in higher operating costs or poor comfort conditions.

#### **Require Duct Insulation**

Heat pump jobs often are very similar to commercial summer air conditioning installations. For instance, Southern California Edison and other utilities recommend that the first 10 ft of the supply and return ducts be internally lined with acoustical insulation (item 4). The minimum standard calls for ½ in thick, 2 lb density, long fiber mineral wool with a vinyl (or equal) coating to prevent the fibers from breaking off and being carried along in the air stream.

The 10 ft acoustical treatment is the minimum recommendation and extremely quiet operation requires additional treatment such as installation of acoustical mufflers.

## Supplementary Work Sheet Basic Recommendations for Heat Pump Installation

#### INSTALLATION

- 1) Vibration isolation equipment.
- 2) Equipment operating noise.
- 3) "Flexible" duct and piping connectors.
- Acoustical insulation at supply and return plenums.
- 5) Proper placement of supply outlets.
- 6) Adequate number of supply outlets.
- 7) Durable ducts.
- 8) Balancing dampers.
- 9) Provision for outside air in-
- Securely fastened and sealed ducts.
- 11) Structural insulation.
- 12) Supply and return air duct insulation.
- Securely attached duct insulation.

- 14) Refrigerant line insulation.
- 15) "On off" and "ventilation only" thermostat control.
- 16) Proper location of thermostat.
- 17) Filter access.

#### **TESTING AND BALANCING**

- 18) Room-to-room temperature variation.
- Air flow, refrigerant pressures, and temperatures.

### EQUIPMENT EXPLANATION TO CUSTOMER

- 20) Warranty and guarantee.
- 21) Responsibility of established equipment manufacturer.
- 22) Automatic defrosting cycle.
- 23) Use of supplementary heat.
- 24) Periodic preventive maintenance contract arrangement.

Item 7, "durable ducts," is included to make sure ducts meet the standards outlined in the National Academy of Science-Research Council report on "Criteria for Ducts" which rules that ducts should be fabricated from materials that insure safety and satisfactory performance.

Where heat loss or gain from a

duct system can have considerable effect on its performance (such as passing through an attic) a minimum of 1 in. of insulation should be used on all supply ducts whose largest dimension is not more than 14 in.; 2 in. is recommended for larger ducts. Usually a 1 in. covering is sufficient for return air ducts.



Now Gives MORE "UMPH" and "POWER" To That ALREADY GREAT-POWERFUL No. 1000 U.S. SUPER BASE DIFFUSER. GREATER FREE AREA IS NOW FURNISHED in the GREATEST-of-ALL PERIMETER INTAKES The No. 2000 U.S. PERIMETER BASE INTAKE Increased Capacity-Efficiency-Beauty and Economy.

FROM the MOST MODERN and FINEST REGISTER and GRILLE FACILITY

No. 1000 U.S. NEW SUPER-BASE DIFFUS-ERS Afford a beautiful Sense of Security and SATISFACTION. No PERFORMANCE

NEWS EXTRA! New No.1048 U.S. SUPER BASE DIFFUSER has Another Row of Oblong Openings. Now-Capacity for 6,7,008 Round Supply Pipes

Made in No. 1024 (2 foot Sections) No. 1048 (4 foot Sections) Longer Lengths or Runs can be made Using Multiple Sections set end to end with Connectors.

ANOTHER NEWS EXTRA! New No. 1024 has Another Row ANUTHER NEWS EXTRA: TVEW NO.1024 has Another Row of Oblong Openings to Boost Supply Power. Now odaptable of Oblong Openings to even 6" Round Supply Pipes to use of 4,"4½",5" and even 6" Round Supply Pipes

No. 2000 U.S. NEW PERIMETER BASE IN-TAKES ELIMINATE RETURN AIR PROBLEMS and GUARANTEE UNIFORMITY and MATCH-ING APPEARANCE of No. 1000 DIFFUSERS and No. 2000 INTAKES

New No.2048 U.S. PERIMETER BASE INTAKES--4 foot length GREATER FREE AREA New No. 2024 U.S. PERIMETER BASE INTAKE---

Do Not Take Substitutes - Get the BEST - U.S. No. 1000's NEW LARGER CAPACITY No. 1000 BASE DIFFUSERS are IDEAL for COM-MERCIAL SYSTEMS.

REGISTER COMPANY

CITY

Century Motors



# Why Century Electric motors give quiet, dependable service

Century Electric motors designed for the air conditioning and warm air heating industry help reduce costly service calls. Here are a few of the features that give quiet, dependable operation.

QUIET BECAUSE cushion base has resilient rings which keep motor from metallic contact with base. Result: reduced transmission of sound vibrations.

QUIET BECAUSE it has sleeve bearings. The shaft floats on a film of oil. You can pull the belt up without getting any bearing rumble.

QUIET BECAUSE rotor bars, end rings and fans are all integrally cast of aluminum. Rotor is dynamically balanced to assure extra smooth operation.

**DEPENDABLE BECAUSE** lubricating method is designed to withstand warm air furnace operating conditions.

DEPENDABLE BECAUSE insulation includes bonded paper and "Mylar" slot cells and high temperature baking varnish. Result: high mechanical and dielectric strength.

DEPENDABLE BECAUSE governor doesn't stick to shaft. Corrosion or contaminants do not affect its action. Means dependable operation in all atmospheric conditions.

DEPENDABLE BECAUSE of other features such as automatic thermal overload protection; position grounding strip on cushion rings and pressure cast aluminum bearing brackets.

Also available from Century Electric: Two speed (1800/1200 RPM) 48-frame motors for combination heating-air conditioning units; and 56-frame motors for heating-cooling installations.

For more information please contact your nearest Century Electric Sales Office or Authorized Distributor. For detailed information on motor applications write for the new Century Electric Motor Application Guide . . . bulletin 270A.

### CENTURY ELECTRIC COMPANY Century

St. Louis 3, Missouri Offices and Stock Points in Principal Cities







(above) Century Electric fhp motor installed on double entry blower. (left) Attractive metal stand is available to help you display and sell Century motors.

You can solve all your motor problems with Century's complete line of fractional-horsepower motors.

## When You Guarantee to 'Heat Satisfactorily' ...

... courts are likely to refer to a rule demanding "substantial performance," which is hard to prove if the customer isn't satisfied and hasn't paid for the job

IN A CONTRACT to install a residential warm air heating system in one of the southern states the dealer-contractor stipulated in his contract: "We guarantee the heating system installed in your home to give heat satisfactorily."

Later when the dealer-contractor brought action to foreclose a lien for the material, equipment and labor, the owner defended that the system did not heat the house satisfactorily as the contract had guaranteed. The dealer-contractor maintained that he had substantially performed his contract.

#### **Owner Can Refuse**

The courts of that state have held:
"If a contractor has failed to perform his part of the contract or has performed it in a different manner from that provided by the contract, or abandons the work, the owner can refuse to accept it and require (satisfactory) performance before being liable on the contract price or for the reasonable value of the services.

#### 'Pro-Rate' Value of Work

"That which will make an owner liable for the value of the services rendered on a partial or incomplete performance on the part of the contractor, does not necessarily amount to a waiver of the owner's right to recover damages for the contractor's breach; and upon the whole he should certainly have such amount deducted from the price as will be equal to the difference between the

value of the work agreed to be done and that of the work done."

This statement of the rights of the owner had been contained in the decision of the same court in another action less than two months before the controversy over the installation of this warm air heating system.

The court, in the earlier decision, had continued:

"It may be observed further that a distinction exists between a contract to construct a dwelling for the owner who plans to live therein and a contract to construct a commercial structure where the aesthetic taste of the owner is not so deeply involved. It seems to us that when the owner contracts to have a dwelling constructed, he wants a particular structure, not just any structure that could be built for the same price."

#### Refer to Earlier Rule

The question of substantial performance is governed by a rule laid down by an eastern state court. The southern court, in its decision of the mechanic's lien action in the case of warm air heating system installation, referred to this rule. Unfortunately for the dealer-contractor his guarantee of satisfaction proved to be his undoing.

"What constitutes substantial performance," said the court, "has been a fruitful source of litigation. Substantial performance is performance except as to insubstantial omissions, with compensation therefor. Where the omission is slight and unintentional, in order to prevent hardship of a failure to recover even for that which was well done, compensation is substituted to the extent of the work performed.

"The rule is that where a contractor has, in good faith, intended to comply with the contract and has substantially complied with it, although there may be slight defects caused by inadvertence or unintentional omissions, he may recover the contract price less the damages on account of such defects. Slight and insignificant imperfections or deviations may be overlooked but the contract in other respects must be performed according to its terms."

#### **Overlook Minor Details**

Courts follow this rule allowing a recovery for substantial performance because they feel: 1) it is virtually impossible to comply with minute specifications, and 2) the parties to the contract have at least impliedly agreed to do what is reasonable in relation to performance.

Here, however, the circumstances also involved the guarantee that this heating system was to be installed to the satisfaction of the owner. In some instances, it has been held that such satisfaction must be obtained before a claim may be made for substantial performance.

In its conclusion, the court denied the dealer-contractor a recovery since his services had failed to win the satisfaction of the owner. "The dealer-contractor," said the court, "is not entitled to recover in this case. He has the right to remove the system, and if he fails to do so within the time specified the owner is permitted to remove the system."

[Note: While this discussion applies to actual cases, it should be remembered that legal rules vary in different states.]

# THREE ANSWERS TO BETTER BUILDING WITH HUSSEY COPPER FLASHING

#### HUSSEY RIGID-RIB FLASHING

A new economical corrugated copper flashing recommended for lighter duty Thru Wall applications and all interior beam, spandrel and sill flashing. When you want the durability of solid copper, good expansion characteristics, corrosion-resistance to alkaline materials such as concrete, and real economy it's Hussey Rigid-Rib for you.

#### MAJESTIC 3-Way Thru Wall FLASHING

Here is today's finest copper Thru Wall safeguard against moisture penetration in masonry or panel wall construction. Built to a patented design, Majestic 3-Way Thru Wall Flashing bonds strongly with mortar and is highly resistant to the alkalinity of cement and mortar. Its heavy gauge withstands required handling during construction and will outlast the building itself.

#### HUSSEY SHEET and ROLL FLASHING

Here's the all-purpose plain copper flashing in a choice of gauges to suit your application in sheet or roll form to meet every construction need. Its easy workability, ease of joining or soldering lets you save enough time to still further increase its economy.

## HUSSEY COPPER BUILDING PRODUCTS

Copper Sheet Metal
Rolled Copper Flashing
Copper Eave Troughs
Roof Drainage Accessories
Majestic 3-Way Thru Wall
Copper Flashing
Copper Ridge Roll
Copper Tubing
Copper Conductor Pipe
Copper and Brass Pipe
Copper Mails

### C. G. HUSSEY & CO. (Division of Copper Range Co.)

ROLLING MILLS AND GENERAL OFFICES
PITTSBURGH 19, PA.

7 Convenient Warehouses to serve you promptly



HUSSEY

### WHAT THE ASSOCIATIONS ARE DOING

#### Uses State Fair As Publicity Medium

SAN FRANCISCO — The Warm Air Heating Institute of Northern California was one of the exhibitors at the California State Fair held recently in Sacramento. Among its exhibits were copies of the booklet "House Heating Secrets," which was also distributed among visitors, and kingsized reproductions of newspaper advertisements used in the association's recent promotion campaign.

# Thanks Suppliers For Their Support

MILWAUKEE — Members of the Sheet Metal Contractors Association of Wisconsin are now using a "Thank you" sticker on all letters to suppliers. Attractively designed and printed in red, white and blue, the seal reads: "Thank you for your support of our association activities."

# Lake County Welcomes New Journeymen Into Industry

HAMMOND, IND. - "We are happy to welcome this year's graduating apprentices into the industry," said Howard Houchens, chairman, Joint Sheet Metal Apprenticeship Committee of Lake County (Ind.), as he awarded certificates of completion to 11 new journeymen at the Second Annual Apprenticeship and Old Timers' Banquet. The program honoring the apprentices also recognized the contributions of all members of Local 303 of the Sheet Metal Workers' International Association with 20 years or more of continuous good standing.

These members, known as the "Old Timers," were credited with being responsible for much of the prestige enjoyed today by the sheet metal industry by Joseph Kaberlein, secretary of the National Joint Apprenticeship Committee. Mr. Kaberlein said, "This industry has been



GUEST OF HONOR, old timer Frank Demein, with 45 years of service, is welcomed by banquet committee (I to r) Howard Houchens, Tom Daily, Mrs. Lola Duba, Frank Demein, William Thorne and James Mickey (rear)

built on the skills and contributions of the old timers in our trade. Much of the acceptance accorded by the public to the use of sheet metal can be traced to the ingenuity of these men. It's our job to continue to develop our skills and techniques to increase the demand for the products we can fabricate."

Ray Heninger, State Supervisor, Bureau of Apprenticeship, said, "Meetings of this type attest to the foresightedness of the industry in strengthening its position in the construction field. Joint meetings, attended by dealer-contractors, journeymen, apprentices and suppliers as well as their wives, tend to contribute to a better understanding between all parties. They also help wives to understand why it is often necessary for the men to attend evening meetings. Progress is a result of unselfish contributions by all segments."

### Old Timers' Club Holds Summer Meeting At Elmhurst; Trophy Goes to Bennett

ELMHURST, ILL. — This year the Old Timers' Club of the heating and cooling industry held its annual Gol-Fun Party at the River Forest Golf Club. Members came from Madison, Wis., Dowagiac, Mich., and Rockford, Ill. to meet with 50 members of the Chicago area.

The 1959 program committee consisted of Charlie Bendix, Charles C. Cochran, Charles R. Bennett and F. J. Moran. Among the activities was a golf tournament, won by Charles R. Bennett, who invites all his friends to come to his office and see the 20 in. trophy which was presented to him.

The opportunity for old friends to get together and discuss industry problems at both the local and national levels is one of the benefits of this



ANNUAL GOL-FUN PARTY committee of the Old Timers' Club Charles C. Cochran, Charles B. Bendix and Charles R. Bennett review program schedule

summer meeting, national chairman C. B. Bendix pointed out. Mr. Bendix also announced plans for holding the 1960 meeting in the East.

#### IHACI Offers Members Hospitalization Plan

Los Angeles — The Institute of Heating and Air Conditioning Industries reports that a hospitalization and surgical plan is now available to members of the institute.

(More association news on page 96)

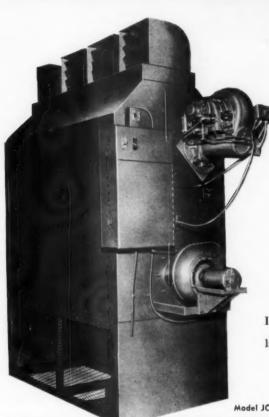


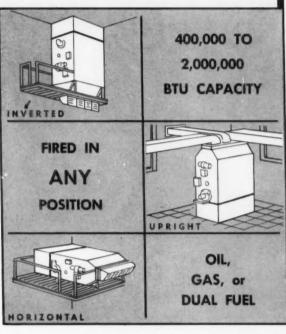
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12 Oil-Fired Suspended Models 153,000 to 1,000,000 Bruh output.



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12 Powerated Tubular Models 208,000 to 320,000 Bluh output.



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### New Officers, Directors for Florida Group

PALM BEACH, FLA. - New officers of the Roofing & Sheet Metal Contractors Association of Florida are: president, Eldon C. Goldman, Winter Park: first vice president, Victor P. Kinsey, West Palm Beach; second vice president, Norman Sandell. North Miami Beach: third vice president, David Hess, Jacksonville; secretary-treasurer. John F. Starr, Clearwater. Directors are: District 1. Walter Anschuetz and Forest Dean; District 2, Charles Stephens, Mack Fillingham and George Ferber; District 3, Jack McCormack; District 4, William Condermann, Wylie Shepherd and William Law: District 5. B. B. McCormick and Vernon Blank: District 6. Howard Carpenter. John Gross and Jack Strong: District 7, Howard B. Hill; District 8, John Ferber and R. C. Tucker.

Subjects covered at the group's recent annual convention held in Palm Beach included suggestions and new ideas for the industry; insurance problems, especially product liability; labor relations problems; safety programs and their effect upon a businessman's insurance premiums; inter-profession relations, especially with the architect and general contractor; and legislation.

# Toledo Publishes New Heating Code

Toledo - Joseph O'Connor, president of the Toledo Heating and Air Conditioning Contractors' Association reports that the Toledo Code of Regulations has been revised and approved by the Heating Board. The new code has a legal section and the remainder is based on the National Warm Air Heating and Air Conditioning code. One regulation calls for a bond in the sum of \$5000 guaranteeing full compliance with all provisions of the code, and binds the surety to correct any violation. Copies are priced at \$2.50 and may be obtained from Don Dieterle, executive secretary of the Ohio Sheet Metal Contractors Association.

## Alabama Association Elects Officers

BIRMINGHAM, ALA. — James H. Pearson was elected president of the Roofing, Sheet Metal, Heating and Air Conditioning Contractors' Association of Alabama at the group's recent annual convention. Other new officers are Wallace Stanfield, first vice president; R. Stanley Keith, second vice president; Redus Brooks, third vice president; and Ferris S. Ritchey Jr., executive secretary and treasurer.

# IHACI Urges Code Revisions

Los Angeles — At a joint meeting and public hearing conducted recently by three committees of the Los Angeles City Council, the Institute of Heating and Air Conditioning Industries went on record against the proposed new heating and air conditioning code for the city of Los Angeles until sections on the signing (Continued on page 98)

### **Coming Events**

#### November

Nov. 2-5 — Air Conditioning and Refrigeration Institute, 11th exposition. Atlantic City Auditorium, Atlantic City, N. J. George S. Jones Jr., managing director, 1346 Connecticut Ave., N. W., Washington 6, D. C.

Nov. 30-Dec. 2 — Northamerican Heating & Air-conditioning Wholesalers, annual convention. Chase-Plaza Hotel, St. Louis. Wilbur R. Bull, managing director, 1200 W. Fifth Ave., Columbus, O.

#### December

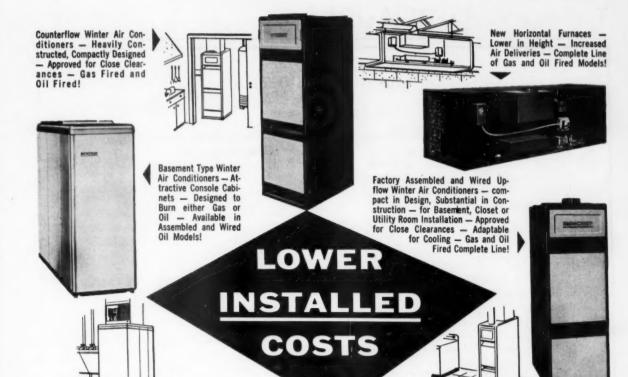
Dec. 1-2 — National Warm Air Heating and Air Conditioning Association, committee meetings. Chase-Plaza Hotel, St. Louis, Mo. George Boeddener, managing director, 640 Engineers Bldg., Cleveland 14.

Dec. 3-4 — National Warm Air Heating and Air Conditioning Association, annual convention. Chase-Plaza Hotel, St. Louis, Mo. George Boeddener, managing director, 640 Engineers Bldg., Cleveland 14.

#### January

Jan. 17-21 — National Association of Home Builders, annual convention. Hilton and Sherman Hotels, Chicago. John M. Dickerman, executive director, 1625 L St., N.W., Washington 6, D. C.

(For additional Coming Events see page 98)



# EVERY TIME with MONCRIEF

#### Easy, Speedy Installations put Profits in Your Pocket!

When you quote the installed price, it's your cost in place that determines your profit.

This is where you gain another big advantage with Moncrief Heating and Air Conditioning Units.

Not only is your purchase price for Moncrief usually less, but Moncrief also saves you important installation money!

For, whether it burns gas, oil or coal . . . is a basement, hiboy, counterflow or horizontal unit . . . is a

compact factory-assembled-and-wired package . . . whether it is partially assembled or is unassembled, every Moncrief Furnace is designed to reduce installation time and effort.

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HEATING AND AIR CONDITIONING UNITS



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### **Coming Events**

(Continued from page 96)

Jan. 31-Feb. 3 — New York State Sheet Metal, Roofing & Air Conditioning Contractors' Association, annual convention. Hotel Stuyvesant, Buffalo, N. Y. Clarence J. Meyer, secretary, 567-569 Genesee St., Buffalo 4.

#### February

Feb. 1-4 — 2nd Southwest Heating and Air Conditioning Exposition. Memorial Auditorium, Dallas, Tex. E. K. Stevens, exposition manager, International Exposition Co., 480 Lexington Ave., New York 17.

Feb. 1-4 — American Society of Heating, Refrigerating and Air-Conditioning Engineers, semi-annual meeting. Baker and Adolphus Hotels, Dallas, Tex. R. C. Cross, executive secretary, 234 Fifth Ave., New York.

Feb. 4-5 — Sheet Metal and Warm Air Heating Contractors' Association of Indiana, annual convention. Severin Hotel, Indianapolis. J. W. Ridgway, president, 53 W. Meredith, Frankfort, Ind.

Feb. 8-10 — Sheet Metal Contractors' Association of Illinois, annual convention. Pere Marquette Hotel, Peoria. Jay E. Harms, secretary, 1619 N. Sheridan Rd., Peoria.

Feb. 12-13 — Sheet Metal and Roofing Contractors' Association of Minnesota, annual convention. Lowry Hotel, St. Paul. Dale Lynch, secretary, 5 W. Lake St., Room 301, Minneapolis 8.

Feb. 15-18 — Annual Industrial Ventilation Conference. Kellogg Center, Michigan State University, East Lansing, Mich. James C. Barrett, Michigan Department of Health, Lansing 4.

#### March

Mar. 7-9 — Sheet Metal Contractors' Association of Wisconsin, annual convention.
Schroeder Hotel, Milwaukee. Robert S.
Schmieder, secretary, 8320 W. Bluemound Rd., Milwaukee.

Mar. 30-Apr. 1 — Gas Appliance Manufacturers' Association, annual convention.
 Greenbrier Hotel, White Sulphur Springs,
 W. Va. Gas Appliance Manufacturers' Association, 60 E. 42nd St., New York 17.

#### April

Apr. 4-7 — Oil Heat Institute of America, annual convention and exposition. Park Sheraton Hotel and the Coliseum, New York City. R. H. L. Becker, managing director, 500-5th Ave., New York 36.

Apr. 28-30 — Roofing and Sheet Metal Contractors' Association of Florida, annual convention. Langford Hotel, Winter Park, Fla. Eldon G. Goldman, P. O. Box 543, Winter Park, Fla.

#### June

June 16-18 — Sheet Metal, Air Conditioning and Roofing Contractors' Association of Pennsylvania, annual convention. Lawrence Hotel, Erie, Pa. Earl W. Liebermann, secretary, 1411 Merchant St., Ambridge, Pa.

#### Requests Code Revisions

(Continued from page 96)

of plans by a mechanical engineer and journeyman licensing are further studied. The committees present were building and safety, personnel and finance. At the conclusion of the session the councilmen voted to take the proposed code, which has been under formulation and study by staff members of the Los Angeles City Department of Building and Safety and an industrywide committee for more than two years, under advisement for 30 days.

The Institute is one of many groups concerned with the two controversial issues, which are: 1) that all plans for heating and air conditioning installations, excluding small jobs, as in residences, must be signed by a registered mechanical engineer; and 2) that the requirement for licensing of journeymen heating plant installers in the present code be extended to include journeyman air conditioning installers.

IHACI was represented by Gerson D. Ribnick, managing director.

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provide fast, clean heat for a variety of applications



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# Gas-fired Commercial and Industrial Heating Equipment

VERSATILE NEW JANITROL UNIT HEATERS

Remember this about Janitrol Unit Heaters: their versatility and efficiency, combined with low cost, means you can use them to advantage for most every commercial or industrial building.

They save installation time and labor. They do not need expensive duct work. They are completely automatic. They offer convenient "dual fuel" performance—use natural or LP gas; may be switched from one fuel to the other automatically. And

they direct heat where needed only when it is needed—assure top operating economy.

And remember, too, that no other unit heater can match their record for durability

and low maintenance. The exclusive Janitrol Multi-Thermex heat exchanger is so enduring that replacements for any cause have been less than \( \frac{1}{4} \) of 1\% in over two million heat exchanger tubes produced since 1940!

Dependability and economy—these are benefits that only time and experience can bring. Be sure Janitrol Unit Heaters are the choice for your next job.

Fill every commercial and industrial heating need from JANITROL'S broad line . . .



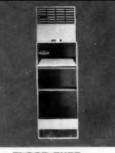
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#### BLOWER-TYPE UNIT HEATER

Allows air delivery from greater heights and against greater static pressures. Models with exposed or enclosed blowers. A.G.A. approved as low and high static-type blower unit heater for air delivery to duct system up to 1.0 in. W.C. external static. Heat sections factory assembled. Sizes: 300,000, 400,000 and 500,000 Btu/hr. input.



#### FLOOR-TYPE UNIT HEATER

Cold air drawn from floor level is heated, filtered and discharged horizontally overhead. Quiet, clean, carefree—ideal for offices, restaurants, stores, labs, etc., requiring a compact unit. May also be connected to a duct system. Six sizes: Rated input from 65,000 to 200,000 Btu/hr.



#### HEAVY DUTY BLOWER HEATERS

For unit heating, central heating and air conditioning. Wide range of standard blowers and motors assures correct air delivery and temperature rise in each application. Factory assembled and tested. Capacities from 250,000 Btu to 1,750,000 Btu/hr. input.



#### NEW JANITROL HORIZONTAL OIL UNIT HEATER

For suspension overhead. Saves floor space. Compact, efficient, low-maintenance design. May also be used to feed duct system. Sizes from 84,000 to 250,000 Btu/hr. output.

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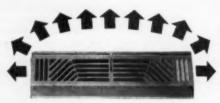
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Perfect pattern air diffusion of Valuaire meets all requirements for perimeter heating or combination heating-cooling. **ECONOMY PRICING** of the new Auer No. 50 *Valuaire* will increase your profits on regular and development jobs where low-cost diffusers are required.

**FAMOUS AUER QUALITY** is built into *Valuaire*. Advanced aerodynamic engineering, top grade materials and rugged construction assure outstanding value at low list price.

**DUAL-PURPOSE DESIGN** makes Valuaire equally efficient for heating or combination heating-cooling. Only 18 inches long, it has the spread and throw of 4 to 8-foot units. Simple balancing adjustment allows accurate setting to desired cfm capacity.

MODERN, SMOOTH FLOWING LINES lend a graceful appearance that blends with any type construction, new or old. Standard Bufftone finish may be used as is, or repainted to match interior.

**FAST, EASY INSTALLATION** is another *Valuaire* economy feature. Package unit is ready to install with only a screw driver.

Compare the price, design, performance and construction of **Valuaire**. You'll find it's your best buy in a baseboard perimeter diffuser.



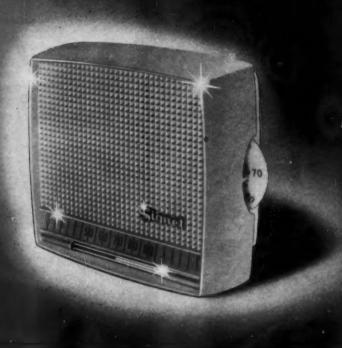
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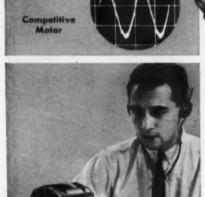
#### YOU CAN SEE THE DIFFERENCE

These actual photographs of the oscilloscope screen show the reduction of vibration in the blower when the Redmond Type AY MicroMotor is used. The photo at the left shows blower vibration with The Redmond AY; the one at the right shows vibration with a competitive motor.

# **QUIETEST** DIRECT DRIVE BLOWER MOTOR



NEW DESIGN REDUCES BLOWER VIBRATION TO ONE-FIFTH THAT OF UNITS USING CONVENTIONAL SHADED-POLE MOTORS



#### YOU CAN HEAR THE DIFFERENCE

Place a mechanic's stethoscope on the end cap and you can easily hear the difference between the newly designed Redmond Type AY and motors of conventional design. Try it on a Redmond 1/6 hp-the noise level is about that of a 1/35 hp motor of conventional design.

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When you replace direct drive blower motors with this new Redmond motor, you solve the problem of vibration noise-it reduces vibration on the blower housing to one-fifth that of units using conventional shaded-pole motors-cuts down what is the basic source of nearly all noise problems. The Type AY is designed and manufactured in every way to give years of whisper-quiet, trouble-free service-it is your guarantee of customer satisfaction.

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# AND YOU'VE GOT THE NEW P-K' GRAND-PAK

Best fastener buy on the market! Next time you order, ask for the P-K GRAND-PAK...it's a smart buy. You get Parker-Kalon quality—the original tapping screw. You get the exclusive Hi-Thred feature developed by Parker-Kalon. And you get a quantity that meets your every-day requirements—big jobs as well as small. Every one of the thousand P-K fasteners in a GRAND-PAK is a genuine P-K Hi-Thred . . . the last thread actually terminating in an annular orifice in the head itself. They grip like a bulldog, even in thin gage sheets . . . and you get

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The GRAND-PAK is factory sealed, carries the Parker-Kalon guarantee, and is *in stock* at your local P-K Industrial Distributor's warehouse ready for immediate delivery. Available cadmium plated in a wide variety of sizes in Pan Head, Type "A".

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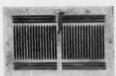
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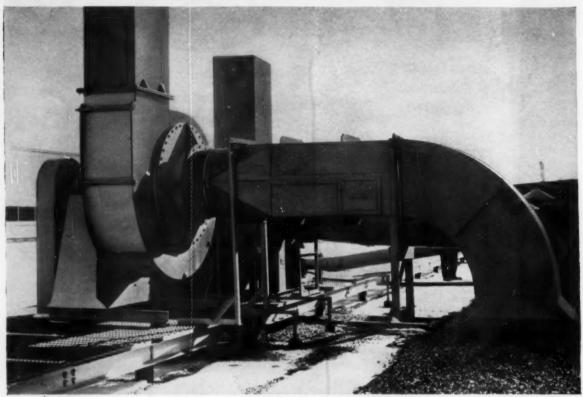
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The manufacturer of this air handling equipment can promise buyers efficiency as high after years of operation as right now. The equipment is made from sheet made of Geon rigid vinyl. Unlike conventional coated blowers and fans which usually handle just one type of chemical fume, this equipment withstands corrosion and residual buildup of nearly all chemicals. Installations are often lower in cost because of weight savings.

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GEON polyvinyl materials • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

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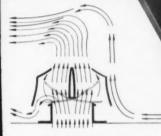
RESERVE EXTRACTION CAPACITY

2 NEW IMPROVEMENTS
MAKE "THE BEST"

for abnormal conditions!

" O/SR " Ventilator with flaps in normal position.

EVEN BETTER!



#### CONTINUOUS POSITIVE EXTRACTION

in any weather-without rotation or running costs.

 AIR-FOIL FLAPS — designed with aid of wind tunnel, new hinged flapsreduce drag and increase extraction lifting effect.

2. ADJUSTABLE CENTER — 3 positions: Wide open for extra hot days, partially open for rainy days, fully closed for cold days.

RECENT INSTALLATIONS—General Controls Inc., Glendale; Rexall Drug Store, Ventura; Almond Growers Exchange, Sacramento; American Electronics Co., El Monte; Hammond Furniture & Fixture, Los Angeles; W. J. Sloane Co., San Francisco; Continental Airlines, Inc., Los Angeles; Harvey Aluminum Co., Torrance; North American Aviation Co., El Segundo.



## NATURAL VENTILATION

Already tested and proved throughout the world, COLT'S "SR" heavy duty ventilators now gain a full 25% extra capacity through addition of adjustable center. Air-foil flaps actually add to air flow velocity when entirely open, yet may be set for rainproof efficiency or entirely closed to keep heat in.

Your client saves money when he installs a COLT system in his plant because there are no running or maintenance costs; he makes money with the increased production resulting from improved employee comfort and morale. More than 45,000 installations in every climate on earth prove COLT'S economy and dependability.

COLT

VENTILATION OF AMERICA, INC.

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Distributors in Northern and Southern California, Kansas and Missouri

#### MAIL THIS COUPON TODAY

Please send, without obligation, items checked:

- Newly revised TECHNICAL BROCHURE of the Colt System.
- "Some Aspects of Fire Prevention in Industrial Buildings", by M. J. Reaney.

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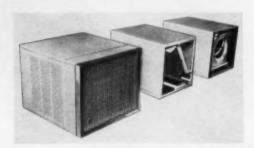
ADDRESS\_\_\_\_\_ZONE\_\_\_STATE

## **EQUIPMENT DEVELOPMENTS**

The latest information on manufacturers' developments is presented here with brief summaries of the applications of these products. For additional product information which is available, see this month's New Literature department

#### **Three-Section Heat Pump**

"TRI-PAK" AIR-COOLED heat pump with remote condenser, indoor coil and air handler which can be installed under eaves, in closet or in breezeway—Perfection Industries Div. of Hupp Corp., 1135 Ivanhoe



Rd., Cleveland 10, O. Coil and air handler can be combined into eight arrangements: four with horizontal air flow, four stacked for vertical air flow, without cutting or fitting of parts; duct openings are precut. Designed for residential and small commercial applications, model 30HS has cooling capacity of 37,000 Btu and heating capacity of 38,800 Btu. Auxiliary heating capacity of 12 kw brings total heat output to 79,800 Btu, the manufacturer reports.

#### **Roll Forming Machine**

DUPLEX TEN-STATION roll forming machine designed for medium and high production—Lockformer Co., Dept. HA-8, 4615 W. Roosevelt Rd., Chicago 50. Unit forms both sides of a sheet in one pass. Machine consists of two ten-station units with 24 ga capacities;



one unit is stationary and the other is movable to accommodate various sheet widths from 10 to 40 in. Forming speeds are up to 120 fpm. Single 10 hp motor powers units through coupled drive shafts. Roller shafts are 1½ in. dia; vertical center distances between shafts are a minimum  $3\frac{1}{2}$  in., horizontal center distances are 6 in.

#### **Electric Humidifier**

"Ultra Vapor" model 4200 electric humidifier with heating element which is completely immersed in ceramic water pan for quick boiling action—Viking Air Products Div. of National-U. S. Radiator Corp., 5601 Walworth Ave., Cleveland 2, O. Designed to supply constant rate of moisture to air stream for correct humidification under all conditions, heating element is regulated by control dial which can be set for low,



medium or high humidification. Special coating is said to diminish lime buildup on the casting. Ceramic pan is unbreakable; nylon pan is designed to withstand water wear and corrosion. Electrical disconnect and cast aluminum steam nozzle which projects ½ in. into the plenum are featured.

#### **48-Frame Motor**

Fractional Horsepower 48-frame motor designed for air moving equipment—Westinghouse Electric Corp., P.O. Box 2099, Pittsburgh 30. Designs are for shaded-pole motors up to ½ hp, and permanent-split capacitor motors to 1/3 hp. Material made of combination of oil and cellulose fibers is inserted in motor and shields for "permanent" lubrication. All moving parts are separated from stationary parts by continuously-maintained oil film. Nylon end-play washers are held against core by flinger washer locked to core with four nylon nipples. Varnish-dipped stator assembly is insulated, rust resistant. Units are designed for various mountings: rigid or resilient, band, end-mount with single or double extended studs, or halo mount.



#### Why the zinc stays on a Bethcon sheet

You can put Bethcon galvanized steel sheets through the toughest kind of forming without flaking or peeling of the zinc coating. Snap locks, Pittsburgh locks, or your own special seams—they're all the same to a Bethcon sheet!

That's because Bethcon is galvanized in Bethlehem's continuous lines, which bond the zinc extra-tightly to the base metal. With a Bethcon sheet, you'll find that the coating will go wherever the base metal goes, and come out just as sound as it started.

There's another advantage in Bethcon, too: the remarkable combination of ductility and strength in the sheet. This

stems from the special annealing cycle in the continuous line. Bethcon sheets are neither too soft nor too stiff, but just right for easy workability and a sturdy end-product.

You can specify Bethcon in cut lengths or coils, in a wide variety of gages, with either copper-bearing (Beth-Cu-Loy) or plain open-hearth steel as the base metal. Our nearest district office will be glad to furnish additional details about Bethcon, or write direct to us at the address below.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

## BETHLEHEM STEEL



(Continued)

Various enclosures are available. Line leads or terminal boards are optional.

#### **Power Gas Burner**

"Wondaire" power gas burner designed to eliminate rumbles and "booms" when starting and stopping—Cox Mfg. Co., Ridgeville, Ind. Burner is in two sizes:



90,000 to 260,000 Btuh, and 200,000 to 400,000 Btuh. "Flame retainer" is designed to utilize more heat. Inspection panels are located near burner and blower. Burner uses natural, mixed or LP gases.

#### **Tank Bottom**

"PERMANENT" TANK bottom comprised of sponge-like compound bonded to heavy steel plate which is formed to fit contour of entire bottom of a 275 gal tank—



Sid Harvey, Inc., 100 E. Mineola Ave., Valley Stream, N.Y. Unit is sealed and clamped to tank with five rust-proof bands, can be installed by one man in 30 minutes, according to the manufacturer. Tank bottom comes in three sizes: 60, 66 and 72 in. long, 10 in. wide.

#### Gas, Oil Furnaces

"CONDITIONAIR" furnaces designated GBC 80-HR and GBC 80-H (gas-fired, counterflow and highboy, respectively) and OBC 70-HR and OBC 70-H (oil-fired, counterflow and highboy, respectively)—Delco Appli-

ance Div., General Motors Corp., 329 E. First St., Rochester 1, N.Y. Gas-fired units feature inshot burner with air tube and stainless steel spreader; air tube guides secondary air which is shaped by spreader into flame that fits combustion chamber. Retention ring is located at opening of gas tube. Oil-fired models feature: 22 ga steel cabinet, direct-drive centrifugal blower powered by 1/6 hp motor suspended on rubber bushings; fuel converter which combines oil burner with stainless steel combustion chamber.

#### **Cooling Coil Cleaner**

"METALENE" CHEMICAL COMPOUND for cleaning and restoring capacity of cooling coils and cleaning permanent filters in air conditioning installations.

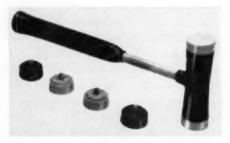
—Lester Laboratories, Inc., P.O. Box 4897, Atlanta 2, Ga. Compound is a water-soluble blend of synthetic penetrants. When diluted with water it can be sprayed



on soiled surfaces of coil, filter or blower and flushed off with garden hose. Unit is said to be non-toxic, nonflammable, non-corrosive, non-evaporating and odorless. Light film applied after cleaning inhibits rust. Product is harmless to paint.

#### Mechanic's Hammer

SHOT-LOADED HAND HAMMER designed to assure controlled impact and prevent work damage—New Plastic



Corp., 1026 N. Sycamore Ave., Los Angeles 38. Selection of hardness tips fits most applications, the company states. Screw-in tips are available in six color(Continued on page 116)

# How to Harness High Velocity Air

... facts about the selection of control units for efficient design, constant cfm delivery, and simplified stabilization of a system

Design and balancing of high velocity systems are greatly simplified by correct selection of currently available air control units. Three basic types meet all requirements: 1. air valves; 2. constant volume regulators; 3. doubleduct control units combining valves and regulator.

These controls can be used independently or in combination, their application depending upon available duct

Model Rair valve

Closed

Throttling

velocity in single- or double-duct systems; 2. controlling double-duct hot and cold air mixing; 3. balancing low velocity ducts or take-offs. Air valves cannot provide constant cfm delivery when there is variation in static pressure in the system.

Model F valves operate very quietly when handling high velocity inlet air. They can be mounted directly behind tical lining is required downstream from the valve.

Constant Volume Regulators. New Barber-Colman SCR constant volume regulators maintain constant cfm delivery regardless of static pres-sure changes in the system. Operation is illustrated in Figure 2. A static pressure increase or decrease above the diaphragm forces it downward or upward, controlling the open area of the baffle plate. Acoustic lining insures quiet operation.

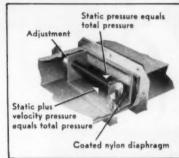
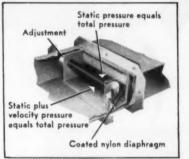


Fig. 2—SCR volume regulator maintains constant cfm delivery for inlet air pressure differences up to 6:1. No power source re-



quired, the regulator operating on as little as 0.50 inches static pressure.

Motor-operated Range Adjustment Removable Constant Volume Regulator

Fig. 3 - Model CV double-duct control unit combines two motor-operated valves (Fig. 1) and a constant volume regulator (Fig. 2) to provide accurate temperature control, velocity reduction, and constant cfm delivery.

space, noise control, balancing requirements, and other variables

Fig. 1 - Motor-operated valves are widely

used in double-duct systems for mixing of hot and cold air. Manually operated valves are

used in branch ducts or take-offs to reduce velocity and/or balance the system.

Full open

Air Valves. Manual or motor-operated valves throttle air flow for: 1. reducing Uni-Flo diffusers when moderate noise level is permissible in the occupancy zone. When Model R valves are used to handle high velocity inlet air, acous-

SCR units greatly simplify design and stabilization. When they are used in branch ducts, the system becomes selfbalancing. (Fig. 5)

Double-Duct Control Units. Another boon to designers and in-stallers is the Barber-Colman Model CV Control (Fig. 3) - two motoroperated air valves and a constant volume regulator in one compact unit. Model CV accurately mixes hot and cold air and delivers constant cfm at reduced velocity. Acoustic lining provides quiet operation.

Send for new bulletin. Valuable high velocity system design data is contained in new Bulletin No. F6598-1 available upon request. Call your local Barber-Colman field office or write:

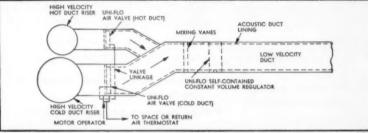


Fig. 4 — Double-duct system with motor-operated valves for hot and cold air mixing. SCR regulator maintains constant cfm delivery to the low velocity duct. NOTE: Model CV unit (Fig. 3) could be used instead of the two valves and SCR regulator.

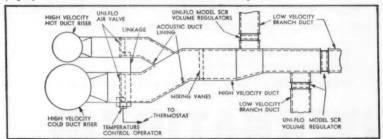


Fig. 5 — Double-duct high velocity system with Model R air valves controlling mixture of hot and cold air. Constant volume regulators in branch ducts make the system self-balancing.



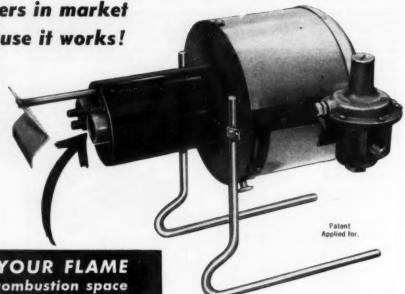
#### BARBER-COLMAN COMPANY

Dept. V, 1306 Rock Street, Rockford, Illinois

# **Hottest Burner Ever!**

Outselling all others in market after market because it works!

From Chicago, from the South, from New England come daily reports of the fantastic sales success of this totally-different TWINSHOT gas conversion burner. Fifteen pounds of silent efficiency never sold so well! And no wonder . . . all combustion air is delivered to the point of use that means unparalleled stability of flame and pilot. And it's EASY TO INSTALL . . . just try it!



TAILOR YOUR FLAME to fit any combustion space



# Exclusive V-3 TUBES HAVE 3 GAS VELOCITIES

Three different gas-air velocities in each burner tube provide unusual flame retention, eliminate turbulance and noise.

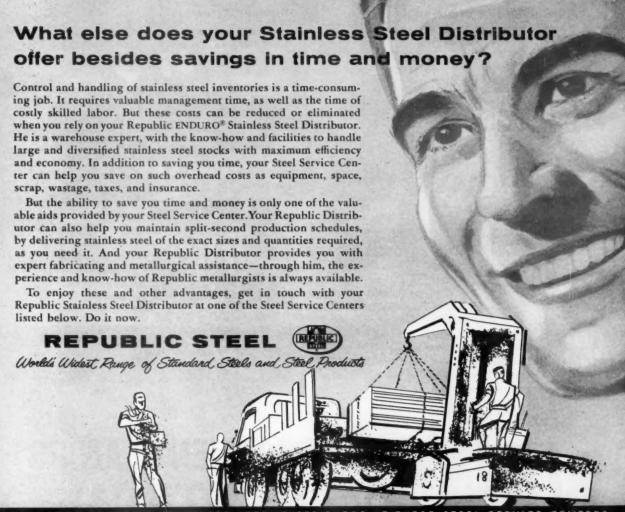
- Mounts in oil burner flange, or leg supported.
- · Pilot, burner tubes rigidly aligned.
- · Competitively priced.
- Entire assembly removable without disturbing any adjustment.
- In most cases, RETAINS FULL OIL RATING OF FURNACE OR BOILER.
- 2 Models A.G.A. listed 70,000 to 280,000 BTU input.



See your International distributor, or write us today for full information and catalog sheets.

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Roanoke 5, Reynolds Aluminum Supply Co., Richmond,

#### WASHINGTON

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CANADA Drummond McCall and Co., Ltd.,

Toronto, Ontario Mantreal, Quebec

(Continued)

coded hardnesses, for working on various materials. Loading increases impact; undirectional glass fiber construction of handle shaft is said to minimize handle breakage.

#### **Continuous Grille**

"UNI-FLO" MODEL STWA continuous line diffusing grille designed especially for continuous runs adjacent to large exterior glass surfaces—Barber-Colman Co., 1300 Rock St., Rockford, Ill. Grille can be mounted



in ceiling, floor, sill or side wall. Sections but together without conspicuous breaks. Unit features aluminum flat flange, has adjustable core which permits control of air pattern through fin settings. Vertical air pattern is deflected 5 deg, can be altered up or down by inverting the grille. Unit is also available with 15 deg vertical deflection. Spring clip or screw fastening methods are optional.

#### **Damper Actuators**

"ZONE-A-TROL LOW VOLTAGE motorized damper actuators for new or existing air conditioning or warm air heating systems—Econo Products Co., Div. of Viking



Instruments, Inc., East Haddam, Conn. Installed on air supply ducts to each room or zone, actuator is controlled by individual thermostat; as thermostat calls for heating or cooling, unit automatically opens damper and lets air flow until thermostat is satisfied, then closes damper. Units install in any position on any size or shape duct up to 22 in. Motor switch assembly activates blower and furnace controls when one or more thermostats call for heat.

#### **Air Handling Unit**

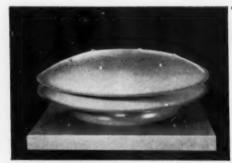
Series HB air Handling units in 2, 3 and 5 ton sizes

—Fraser-Johnston Co., 1900 17th St., San Francisco 3.

Dual-purpose unit can be suspended free in the area

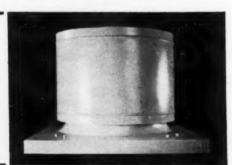
(Continued on page 121)

# NEW AXIAL ROOF VENTILATORS BY WESTERN



The Westernaire®
Low Silhouette Hooded
Exhaust Ventilator

The Westernaire®
Low Silhouette Vertical
Exhaust Ventilator



Above: A high efficiency power unit in a low, weather-proof housing. For both commercial and industrial use 360 degree near horizontal discharge. Aerodynamically correct spun housing. Heavy guage steel, aluminum or non-corrosive Fiberglas\* construction.

Low silhouette high efficiency power roof ventilators for vertical or horizontal air discharge provide motor mounting below the venturi to achieve styling compatible with modern architecture plus a smooth airstream discharge pattern.

Other type ventilators include: Rotary, Stationary, Directional, Continuous Ridge, Unit, Power models.

#### **WESTERN ENGINEERING & MFG. CO**

P. O. BOX 66455, LOS ANGELES 66, CALIFORNIA

\*TM- Owens Corning Fiberglas Corp. Above: High capacity power unit specifically designed for industrial usage. Fumes, smoke, dust-laden and faul air projected high above roof to prevent re-entry into building. "Blowopen" dampers rest on neoprene seal. Completely weatherproof.



Write for catalog and name of nearest representative

Top quality "duct shop" packing.
All cadmium plated.

A name you can trust... Save money by using the BEST!

METAL FAB\* ECON-O-FAB\* JUNIOR\*

GRIP-LOC\* Quality flexible connectors ... easiest to use.

REGULATOR AND QUADRANT SETS Rattle free . . . no air leakage . . . positive lock.

DURO VANE RAIL4 turning vane assembled in 3 easy steps.

REGULATORS QUADRANTS The proper control



OPAX"DAMPER HARDWARE Make quality dampers. Parallel — Opposed



IA-22 " INSULATION ADHESIVE Proven quality, yet most economical.



DUCT TAPE"

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TOOLS FOR SHEET METAL MEN SHUR-GRIP \* FILE AND SOLDER HANDLES



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THE GREATEST NAME IN SHEET METAL SPECIALTIES.

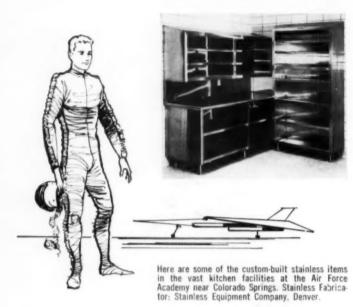
Write for your Duro-Dyne catalogue now

Consider Distributors-Douglas Engineering Co. Ltd., Mantred & Toranto E. H. Price Ltd., Winnipeg & Vancouver

New Product Information Available . . . Write NOW!

New steels are born at Armco

# Look to Kitchens for Stainless Jobs





When you're looking for stainless business, don't overlook commercial and industrial kitchens. More and more of this attractive, durable metal is going into kitchen installations. And getting these jobs benefits you more ways than one.

First, there's the profit from the job. Second, good looking stainless installations are real attention getters. Often they lead to more jobs and you soon build an enviable reputation working with this special steel.

#### Your Armco Distributor Can Help

Stainless steel is easy to fabricate. But if you do run into a problem, just contact your nearby distributor of Armco Stainless Steels. He usually has the answer, or will gladly obtain it for you without delay.

Furthermore, from his steel service center, he can provide you prompt service on the stainless you need in the most economical sizes for your purposes. If you don't know his name, just fill in and mail the coupon.

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# ONLY the ROBERTSHAW UNITROL 400R features

# DEMONSTRATION

to help you sell water heaters!



appearance catches their eye ..



modern design arouses interest



as seen In

Saturday Evening Post, Sunset, and Good Housekeeping





...and demonstration sells them! Specify the amazing new Robertshaw Unitrol 400R with the exclusive slip-top cover and the flip-top lid so that your sales people can demonstrate your water heater! (In addition, Robertshaw Unitrols with built-in pressure regulators increase gas burner ratings and improve ignition performance.)

UNITROL 200R UNITROL 110R (with built-in pressure regulators)



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GRAYSON CONTROLS DIVISION LONG BEACH, CALIFORNIA

There is a dependable Robertshaw Unitrol for every water heater you manufacture

New Glass Fiber Duct Liner

Conforms to Strictest Fire Codes



ULTRALITE Gustin-Bacon's well-known glass fiber duct liner, is now available with a newly developed-and-approved gray fire resistant coating. The new product carries a flame spread classification of less than 25 and complies with all requirements of the National Board of Fire Underwriters' Bulletin #90-A and B and the strictest fire codes.

ULTRALITE duct liner carries an Underwriters' Laboratories label. It is the only liner permanently stamped with density and flame spread classification . . . the only liner made exclusively of long strong textile-type glass fibers that impart extra strength, resilience and resistance to air erosion. All this—plus ULTRALITE'S famous thermal and acoustical efficiency—are now available at no greater cost than conventional coatings.

For specification data and samples, call your G-B distributor (listed in the adjoining column) or write

CUSTIN-BAGON MAG G BO SACON

Thermal and acoustical glass fiber insulations • Molded glass fiber pipe insulation • Couplings and fittings for plain and grooved end pipe

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#### equipment developments

(Continued)

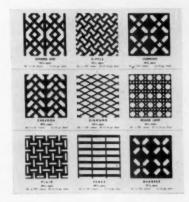
to be air conditioned, with addition of double deflection discharge heat and filter screen. Unit is also suit-



able for installation in horizontal ductwork. Large fans have low tip speeds. Five ton unit features twin blower wheels. Condensate pump is available where natural drain is not available.

#### **Perforated Metal Patterns**

LINE OF 12 DECORATIVE perforated sheet metal patterns-Harrington & King Perforating Co., Inc., 5655 W.



Fillmore St., Chicago 44. Patterns are available from stock in 36 × 120 in, sheets of 22 and 24 ga. Several designs are also available in 20 ga

#### **Electric Hand Nibbler**

MODEL HN HEAVY DUTY electric hand nibbler which cuts up to 5 fpm -Fenway Machine Co., 3107 N. Broad St., Philadelphia 32. Portable nibbler is said to cut without distortion on both sides of sheet with no

rough edges, chipping, binding or curling. Unit cuts ferrous or non-ferrous metal; capacity is 8 ga mild steel, 10 ga stainless steel. Total weight is 8 lb.

#### **Dust Collector**

SERIES 345 VERTICAL tube mechanical dust collector designed to eliminate plugging, for use in cement plants-American-Standard Industrial Div., Detroit 32. Large (15 in.)

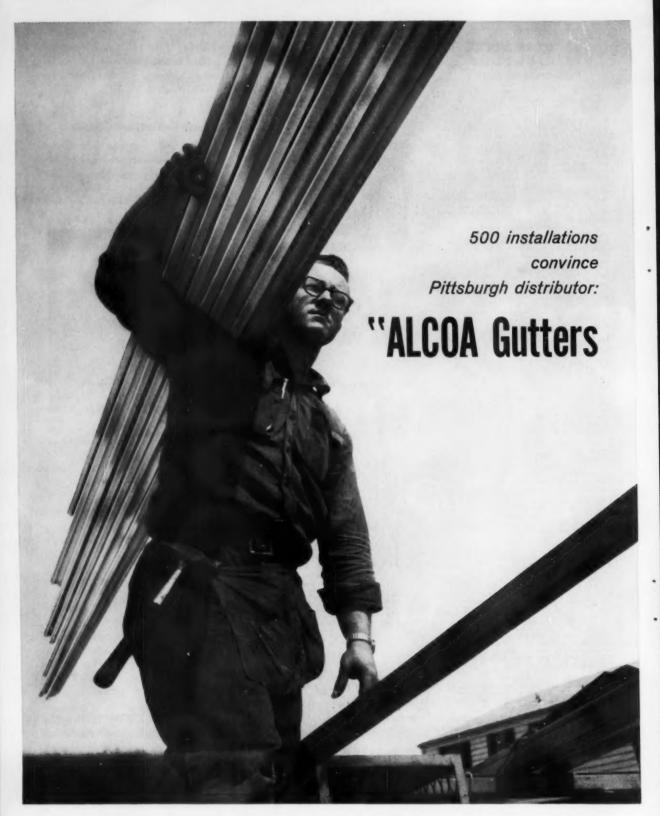


vertical steel inlet tubes are tapered at outlet to minimize plugging. Allwelded unit consists of combination of collector sections which can be built up to meet requirements. Heavy gage steel inlet tubes have large openings and smooth walls.

#### **Roof Ventilator**

INDUSTRIAL POWER ROOF ventilators in capacities from 8000 to 80,000 cfm-Structa-Lung Co., 36407 Euclid Ave., Willoughby, O. Heat, moisture, dust and fumes are exhausted in a 20 to 30 ft vertical jet. Unit can be installed on any roof. Fan support assembly for larger models consists of 3 × 3 × 3/8 in. framework of structural angles and 3/8 in. plate. Exhauster is all-welded construction. Fresh air breather duct protects and ventilates fan motor. Pair of automatic dampers in top of ventilator opens to provide unobstructed air exit when fan is turned on. When fan is off, dampers close to seal opening against leaks. Optional equipment includes safety screen, work

(Continued on page 124)



Sixteen-foot standard lengths of Alcoa Gutter and Downspout systems mean fewer joints, a neater, faster installation. Light weight makes handling fast and easy.

"Alcoa Gutters and Downspouts are applied with Alcoa Gutter Seal and the Alcoa "pop" riveter so that time-consuming hot soldering is eliminated and installation time reduced," says George Gyekis, president, Miller-Gyekis, Inc., Pittsburgh.



# and Downspouts are easiest to install"

"After 32 years' experience with gutter and downspout installations, I'm convinced that the new Alcoa system is the biggest improvement in hanging gutters I've ever seen," says George Gyekis, president of Miller-Gyekis, Inc., Pittsburgh roofing, sheet metal and building products company.

"This statement is based on almost 500 installations that range from \$15,000 development homes to \$100,000 mansions," says Mr. Gyekis. "In less than a year, the Alcoa system has gained phenomenally fast acceptance here with architects, contractors and installers. Everyone realizes it's a terrific buy. Installation is so simple. The entire assembly job can be done with a simple tool, and the aluminum can be shaped to fit any installation. In fact, lightweight aluminum goes up so quickly that the savings in labor costs virtually pay for the added cost of

this higher quality, heavier gage system. Thus, you get greater value for the same money.

"But our customers have found that this is only the beginning of their savings. Extra-heavy, corrosion-resistant aluminum eliminates painting and maintenance. Longer life is assured. In spite of an unusually severe winter here, we have had no repair or replacement work of any kind on Alcoa installations."

Success stories like this are repeated almost daily in every part of the country as builders and homeowners quickly discover the extra advantages of Care-free gutter and downspout systems of Alcoa® Aluminum. Find out how you can benefit. Call your nearest Alcoa sales office today. Or send coupon below to: Aluminum Company of America, 1892-F Alcoa Building, Pittsburgh 19, Pa.



Precision manufacturing holds tolerances to  $\frac{1}{14}$  in. for easily assembled, tight-fitting joints. Exclusive Alcoa Gutter Seal and the fast-acting "pop" riveter complete the job. The pliable Gutter Seal, packaged in collapsible tubes, assures watertight seals for the life of the gutters.



Your Guide to the Best

For Exciting Drama Watch "Alcoa Theatre," Alternate Mondays, NBC-TV, and "Alcoa Presents," Every Tuesday, ABC-TV

Aluminum Company of America 1892-K Alcoa Building Pittsburgh 19, Pa. Please send me detailed information

Please send me detailed information on Alcoa rain-carrying equipment, including name of nearest distributor.

Name

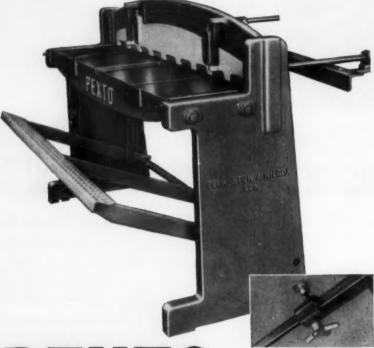
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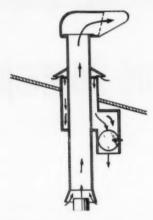
#### equipment developments

(Continued)

platform, special coatings for corrosive gases and high temperature construction.

#### **Compensating Flue System**

COMPENSATING FLUE system featuring fresh air sleeve around exhaust flue to admit proper amount of combustion air—Eclipse Fuel Engineering Co., 1100 Buchanan St., Rockford, Ill. Damper at air opening can be controlled by limit switch to admit



proper amount of outdoor air for combustion in blast-fired gas furnace with minimum requirement of 10 cu ft of air for each 1000 Btu of fuel burned. Self-balancing system admits only as much air as is exhausted up the stack with flue products. Limit switch insures that damper is open before burners are ignited. System can be used with atmospheric combustion equipment if stack is high enough to provide positive draft through flue.

#### **Power Roof Exhauster**

Type L line of glass fiber power roof exhausters for general ventilation requirements—Gallaher Co., 41-08 Dodge St., Omaha 31, Nebr. Features are light weight, permanent color, corrosion resistance and quiet operation, the manufacturer states. Low-silhouette units range in tip speed from 1650 to 3040 fpm; units operate at 1050 or 1550 rpm.



# Furnaces by Chrysler

#### Designed—and built to boost your sales to project home builders

What's it take to sell furnaces to large volume builders? Three things: An edge in price. A nationally known brand with buyer acceptance. A top quality line with no service headaches. Chrysler gives you all three.

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Airtemp Division, Chrysler Corporation, Dept. N-109, Dayton 1, Ohlo Canadian Distributor: Therm-O-Rite Products, Ltd., Toronto, Ontario

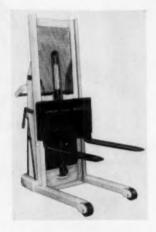


#### equipment developments

(Continued)

#### Lift Truck

MODEL 5954 BATTERY-powered, hydraulically operated telescopic lift truck with 1500 lb capacity—Big Joe Mfg. Co., Ralph Hines Rd., Wiscon-



sin Dells, Wis. Equipped with 12-v battery and self-contained battery charger, unit is designed to lift loads up to 57 in. yet can be manipulated through low doorways and narrow aisles. Other models have lifting heights up to 67, 77 and 87 in.

#### **Heat Pump**

Model RHP-53 air-to-air 5 ton heat pump with outdoor control system— Westinghouse Air Conditioning Div. P. O. Box 510, Staunton, Va. Indoor section, designed for vertical, coun-



terflow or horizontal air flow, has large squirrel-cage blower with rubber-mounted motor. Blower can be set for automatic or continuous operation. Outdoor section, with coil and

# Lever Punches with extra value "built in"

W. A. Whitney punches are dropforged, high-grade alloy steel. All wearing parts are heat-treated to provide outstanding performance and long life on the toughest jobs. Here are three examples typical of the complete line available:



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Offers a capacity of a %s'' hole through %s'' iron. Depth of throat  $1^{11}/s''$ . Price of \$25.50 includes one round punch and one die of specified size plus die-adjusting key. Round punches and dies available in choice of 26 standard sizes from %s'' to %s'' by %s''.



#### COMPACT NO. 4B PUNCH

Available for only \$8.50 with three punches and dies or with seven punches and dies in metal case for \$11. Perfectly balanced with a natural grip, it has capacity of  $\frac{1}{4}$ " hole through  $\frac{1}{4}$ " iron, throat depth is 2". Stock size round punches from  $\frac{1}{4}$ " to  $\frac{1}{4}$ ".





not both punching and notching — has capacity ranging from 2" hole through ¼" iron to ½" hole through ¼" iron. List price of \$92.66 includes one round punch and die up to ¾" x ½" and bolster plate. Stock size round punches from ½" to 1" by ½" and 1½" to 1" by ½". Punches channel iron with 2½" flange by ¾". Punches channel iron with 2½" flange by ½" x ½". Notching attachment handles angles up to 1½" x ½" x ½".

W. A. Whitney tools are unconditionally guaranteed.

## WAWhitney Mfg. Co.

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Strong, rigid, well-balanced Crescent Hacksaws are designed for the exacting mechanic. Choose from five popular patterns having wood, steel or Neoprene handles and nickel or chromium plate finish. The Neoprene handles are far superior to plastic. They are impervious to oil and acid, unaffected by extremes of heat or cold, have high dielectric value and are practically unbreakable.

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New hidden, patented\* filter

-3 times more power

The new Premier Model P-950 Vacuum. with the new hidden, non-clog filter, is the only true low cost furnace cleaner. The hidden filter gives you more usable capacity than other vacuums twice the size. You can clean 4-5 home furnaces without emptying. Yet it is so small it fits easily on the floor of your car. Over 2000 in use. Other models range from 16-48 qt. usable capacity, including 3 in 1 units: wet or dry, blower or shoulder vac.

\*patent number 2814357



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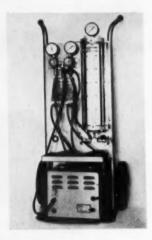
#### equipment developments

(Continued)

automatic defrost controls, has vertical discharge to prevent damage to shrubbery. Supplementary duct heaters are available in steps of 6 to 24 kw total heat; minimum of 6 kw is required for defrost. Thermal cutout switches to prevent overloading are standard equipment according to the manufacturer.

#### **Charging Station**

MODEL 10260 PORTABLE evacuating and charging station for air conditioners-Vehicle Products Div., Robinair Mfg. Corp., Montpelier, O.



Cylinder measures correct amount of refrigerant 12 to be used for each charging service operation. Sight glass shield is dialed to correspond with pressure shown in cylinder. Components include necessary gages, fittings, high pressure hoses, cylinder, vacuum pump, welded brackets for refrigerant drum. Entire unit is mounted on cart with roller bearing wheels.

#### **Rust, Scale Solvent**

"NECON-101" CONCENTRATED liquid containing rust and scale inhibitor-Northeast Consultants, Inc., 65 Concord St., Framingham, Mass. Solvent dissolves most mineral scales including lime, magnesium, rust, sodium, plaster-of-paris and concrete, without affecting metal surfaces. Com-



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"Quiet Quent" is a soundproof room equipped with a galaxy of complicated test equipment which Armstrong engineers use to measure operating noise levels.

"Quent's" role is an important one because modern home design so often places the furnace in or near a living area, making furnace noise a very critical problem. "Quent" has already helped Armstrong engineers develop new blower and motor applications which offer substantially reduced noise levels . . and they're now working on even more important developments in the battle against noise. The anti-noise projects on which "Quent" is employed are just one small part of the total effort being made by Armstrong engineers to make sure that Armstrong dealers to-morrow, as today, will be able to offer their customers the very best in home heating and cooling equipment.

For, in engineering as in production, every Armstrong employee feels a personal responsibility to protect Armstrong's reputation for quality. And Armstrong management is equally determined to see that they have the equipment they need to do it ... whether it's modern machinery

for the production line or special test equipment like "Quent".

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Division of National Union Electric Corporation

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#### equipment developments

pound is suitable for descaling condensers, compressors, pipe lines, etc., the manufacturer reports.

#### **Gas Air Conditioner**

"OASIS" REMOTE air cooled gas air conditioner-Day & Night Mfg. Co., 855 Anaheim-Puente Rd., La Puente,



Calif. Designed for increased life expectancy by minimizing rotating and

reciprocating parts, unit requires thermostatic, gas service, 110/v electric service and water connections. Cooling unit supplies chilled water to cooling coil on highboy, horizontal or counterflow furnace, or to fan-coilblower unit where system is for cooling alone.

#### **Draft, Booster Fans**

Models 5W, 67DR and 67W booster fans, and models 6, 7, 8, 9 and 10 heavy duty draft fans-McLarty Systems, 2600 Dickman, Battle Creek, Mich. No. 5W, 80 cfm unit for perimeter boosting and remote vent work, fits 6 in. square or round duct, has 4 in. fan blade. No. 67DR, for draft, hard boosting, remote vent work, fits 6 or 7 in. duct, has 51/2 in. fan blade, moves 125 cfm. Model 67W has same applications as 5W, fits 6 or 7 in. duct, moves approximately 100 cfm. Adjustable tubeaxial draft fans have movable motors to adjust draft, Models fit 6, 7, 8, 9 and 10 in. ducts, move 125 to 500 cfm. at zero to 750 F.

#### **Hammer Handle**

"NUPLAGLAS" HAMMER handle made of glass fiber-New Plastic Corp., 1026 N. Sycamore Ave., Los Angeles. Construction, of full length glass fi-



bers, is designed for strength. Grip is oil resistant plastic; handle is permanently locked to hammer head by apoxy bonding system. Self-aligning ferrule adjusts itself to any eye opening.

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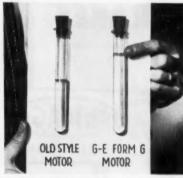
SHAFT PROTECTION—new gun-metal-like Ireatment of shaft resists rust so that the blower is always easy to remove.



"AIR-WALL" DESIGN transmits heat swiftly yet stops entry of dirt. Trip-outs are rare even in hot, cramped quarters.



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#### **Sheet Metal Layout Tables**

Tables for use in the layout of elbows, change joints and curved offsets for heating and air conditioning applications were compiled to save time for sheet metal layout men who frequently encounter time-consuming problems in the process of laying out fittings. According to the author, stretchouts of elbows, slopes of change joints and radii of curved offsets may vary 1/32 in. while stretchouts of curved offsets may vary 1/16 in. Each set of tables is preceded by instructions clarified by diagrams. The book contains 76 pages of tables, is priced at \$4—Paul Agrillo, 600 S. Louis, Mt. Prospect, Ill.

#### **Industrial Exhaust Systems**

How to design, build or buy industrial exhaust systems that will function adequately and economically is explained in the third edition of "Design of Industrial Exhaust Systems," by John L. Alden. The book has been revised and expanded to include sections on new equipment and techniques now available. New data is presented on fog filters, reverse flow filters, venturi scrubbers and multiple miniature cyclones. Subjects covered include: flow of fluids, hoods for dust control;

hoods for fume, smoke and vapor control; air flow through hoods; duct resistance; duct design; dust separators; low pressure conveyors; centrifugal exhaust fans; axial flow fans; structural details and system planning; and field measurements and their interpretation. The book contains 256 pages, is priced at \$6—Industrial Press, 93 Worth St., New York 13.

#### **SMACNA Duct Construction Manual**

Information necessary to fabricate and install sheet metal ductwork used for low velocity ventilation and air conditioning systems is presented in a 135 page,  $8\frac{1}{2} \times 11\frac{1}{4}$  in. manual entitled "Duct Manual and Sheet Metal Construction for Ventilating and Air Conditioning Systems."

The manual does not cover the engineering involving static pressures, velocities or equipment selection, as it assumes the engineer will be responsible for the design of the system. It does spell out how the sheet metal contractor can fabricate according to the design specifications.

The manual, with the aid of page size plates, shows how to construct ducts that are satisfactorily airtight, that will not vibrate or breathe when the air stream varies in pressure and will assure an even flow of air without undue pressure loss.

Construction details for seams and joints, turning vanes, volume dampers, access doors, inspection plates

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and test holes, louver and screens and duct acoustical treatment are explained and illustrated. Fabrication and installation instructions are provided for duct hangers, fire dampers and doors, roof intake and exhaust storm covers, casings and housings, fume hoods, and boiler breechings.

There is also a suggested specification for sheet metal work used for ventilating and air conditioning systems. This specification outlines general conditions; scope of work; work included; work not included; codes, permits and licenses; openings in floors, walls and roofs; taxes; payments; etc. Sufficient leeway has been given the architect or consulting engineer to insert the specific types of equipment he may have in mind when engineering the job.

Price of the manual to non-members of the Sheet Metal and Air Conditioning Contractors' National Association is \$5—Sheet Metal and Air Conditioning Contractors' National Association, 107 Center St., Elgin, Ill.

#### **Air Conditioning Noise Control**

"AN INTRODUCTION TO NOISE CONTROL" includes information on "Quiet-Duct" silencers for air conditioning and ventilating systems. Also described are

"Quiet-Vent" silencers for walls and ceilings, designed to prevent noise from passing through return air vents, and "Quiet-Flow" silencers for cooling towers. Booklet is illustrated with product and application photos—Industrial Acoustics Co., Inc., 341 Jackson Ave., New York 54.

#### Oil and Gas Furnaces

Two four-color, illustrated catalog sheets describe the design and engineering features of "Blue Ribbon" oil and gas fired winter air conditioners. Specifications are included—Thatcher Furnace Co., Centre St., Garwood, N. J.

#### **Low Velocity Air Diffusers**

BULLETIN No. 649 describes five basic types of low velocity air diffusers. Sizes, cfm capacity ranges, special features and applications for each type of diffuser are included—Multi-Vent Div., The Pyle-National Co., 1334 N. Kostner Ave., Chicago 51.

#### **Textured Metals**

BROCHURE describes textured metals and illustrates typical applications as well as patterns now available. According to the company, textured metals become more rigid than the original sheet with no gain in

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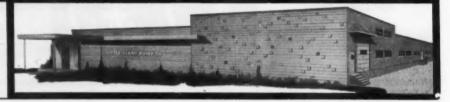
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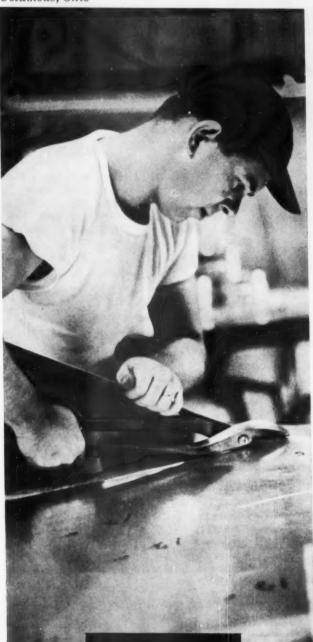
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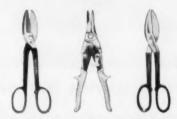
United Sheet Metal Co., Inc. Columbus, Ohio



Well known metal contractor and leading manufacturer of high pressure ducts, United Sheet Metal Company has built its reputation on quality work and close tolerances.

"It is these very tolerances that dictate our choice of Wiss Snips," says Vice President James McGill. "Particularly on stainless and other tough alloys, we find nothing matches the precision cutting ability of Wiss Snips. And they seem to retain their sharpness and cutting power for years. You might say they're the most prized tool our men possess."

Wiss Snips are the pride of sheet metal workers everywhere for a very good reason—they're made by metal craftsmen for use by metal craftsmen. Next time you need snips, specify Wiss—the standard of perfection for over 100 years.



Inlaid Metal-Master Solid-Steel

WISS INLAID BLADE SNIPS cut with lasting sharpness, tremendous power. High carbon crucible steel blades, welded to hot drop-forged frames. Complete range of sizes, 111/2" to 17". Models: straight cutting, circular cutting, curved blades, and bulldog notching.

WISS METAL-MASTER AVIATION SNIPS, with amazing compound action, cut with half the effort required by conventional snips! They are preferred by many for their compact size, and ability to make intricate cuts. Left, right and straight cutting models, only 10" long, cut 18 gauge metal. Bulldog combination model, 91%" long, cuts 16 gauge stainless steel!

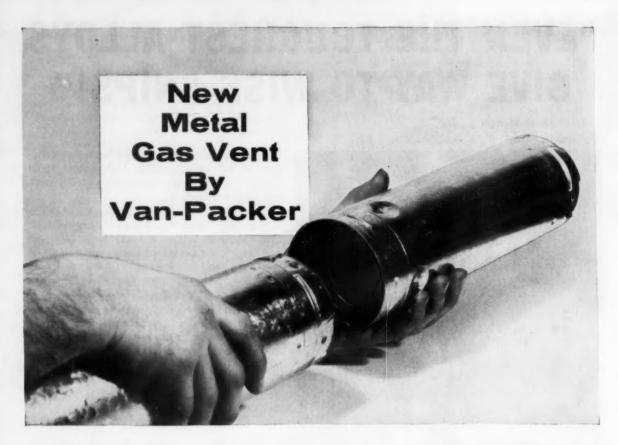
WISS SOLID STEEL SNIPS, made from a special grade of solid tool steel, are available in straight cutting, circular cutting and bulldog models from 7" to 16". Priced slightly lower than inlaid snips.

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### Double-wall vent with interlocking joints for easy assembly

The best performance features of air insulated gas vent systems are incorporated in the new Van-Packer system: (1) Unbroken air movement from draft hood to cap (2) Gas tight joint construction (3) Safety through low wall temperatures.

The Van-Packer gas vent is strong too. The outer wall is durable 28 gauge galvanized steel. Inner wall is .016 inch aluminum.

As far as assembly goes, you need nothing — no tools, just push-snaptwist. Joints are smooth, too. No sharp edges or corners to cut fingers or tear gloves.

Van-Packer gas vent pipes and fittings meet all gas venting situations, building and code requirements. The round vent pipes are sized from 3 to 20 inches in diameter and the oval pipes are in 4 and 5 inch sizes. UL listed for Type B and Type BW service.

Only Van-Packer, world's largest manufacturer of flues, offers you Metal or Masonry Gas Vents, All-Fuel Masonry Chimneys and Prefabricated Refractory Smoke Stacks. Write for Gas Vent Catalog MGS-34-11.





Attractive Van-Packer cap is new symbol of quality in metal gas vents.



28 gauge galvanized steel outer wall and .016 inch aluminum inner wall.

weight and also provide a surface offering many costsaving and functional advantages-Ardmore Products, Inc., 169 Aldene Rd., Roselle, N. J.

#### Furnaces, Year 'Round Systems

HEATING AND AIR CONDITIONING catalog illustrates gasfired forced air furnaces as well as air conditioning units installed with various models of furnaces. Cutaway views show construction features. Specifications are included-Chattanooga Royal Co., First and Delmar Sts., Chattanooga 6, Tenn.

#### **Blowers for Furnaces, Air Conditioners**

SERIES "T" DIRECT MOTOR DRIVE BLOWERS for residential heating and air conditioning systems are described in a two page data sheet illustrated with dimensional diagrams and selection charts. According to the company the blower maintains constant cfm regardless of static pressure by automatically adjusting its speed to compensate for changes in pressure. Thus, the company states, it is not necessary to know the internal resistance of the furnace nor the kind of ductwork the installer may encounter. Motors, equipped with prelubricated bearings, are designed to function properly for 20,000 hours under normal usage without relubrication-Viking Air Products, Div. of National-U.S. Radiator Corp., 5601 Walworth Ave., Cleveland.

#### **Dust Collector Accessories**

INFORMATION on dust collector accessories is presented in a two-page, illustrated data sheet. Included are photographs and descriptions of dust nozzles, hose, exhaust silencers, elbows, air flow tees, branches, reducers, adapter sleeves, fume hoods and wheel hoods -Torit Mfg. Co., Dept. KP-3, Walnut and Exchange Sts., St. Paul, Minn.

#### Surface-Protective Hammers

LITERATURE covers hammers designed for attachment of different types of hardness tips. Interchangeable screw-in tips are available in six hardnesses. Also described are hammer handles featuring chemical resistant grips and shafts reinforced with glass fiber yarn -Nupla Mfg. Co., Div. of New Plastic Corp., 1026 N. Sycamore, Los Angeles 38, Calif.

#### Motors

CATALOG illustrates fractional hp electric motors, blowers, replacement kits, fan blades and accessories -Redmond Distributors Div., 201 Monroe St., Owosso, Mich.



For MODERNIZATION OR NEW CONSTRUCTION



call for heat.

are wired in series and connected to

the furnace controls to supply heat

whenever one or more thermostats

A Complete Line of Zone Controls For Every Heating and Cooling System





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WARM AIR HEATING OR

AIR CONDITIONING SYSTEM



SEND TODAY FOR COMPLETE INFORMATION ECONO PRODUCTS COMPANY, INC.

Division of Viking Instruments, Inc. East Haddom, Connecticut



# CUT FABRICATION TIME AND COST...

#### with Buffalo Universal Iron Worker

If you, too, are looking for a way to lower fabrication costs, consider the Buffalo Universal Iron Worker. Here is a machine which handles angles, tees, channels, bars and flats, performing the following operations:

> SHEARING PUNCHING NOTCHING

COPING MITERING SLITTING

Two men may use this machine at the same time, as shown in the above illustration. In addition, this is the only machine made that has both notching and coping operations available without changing tools. Saves space, too, since this one machine does the work of six. If you want to reduce fabrication time and costs, phone your "Buffalo" machine tool dealer for full information on the Buffalo Universal Iron Worker. Or write for Bulletin 360-H.

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Buffalo Pumps Division, Buffalo, N.Y. Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING . PUNCHING . SHEARING . BENDING

#### **Building Insulation**

"New Lower Costs in Insulation Application" describes how use of reflective type insulation saves time in the construction of an average home. Installation photos are included—Reflectal Corp., 200 S. Michigan Ave., Chicago 4.

#### **Powered Roof Ventilators**

CATALOG presents information on power roof ventilators featuring low silhouette, aluminum extrusions, obstruction-free inlet, side discharge, ball bearing fan shaft, tubular frame construction, easy access for servicing, and belt driven fan assembly. Methods of testing and balancing are outlined. Also included are specifications, dimensional data and velocity graphs—Greenheck Fan and Ventilator Co., Schofield, Wis.

#### Refrigerants

Data sheet lists physical, chemical and performance characteristics of five "Ucon" refrigerants (11, 12, 22, 113, 114). Included is a table showing the vapor pressure (psia) for the five refrigerants over a temperature range from minus 150 F to plus 200 F—Fluorocarbons Div., Union Carbide Chemicals Co., 30 E. 42nd St., New York 17.

#### **Burner Replacement Parts**

REPLACEMENT PARTS for oil and gas burners are listed in a 292-page catalog containing over 2000 illustrations. Trade prices are not shown with product descriptions, thus the book may be used as a sales aid to show customers features of products listed and illustrated. Send requests on company letterhead—Sid Harvey Inc., Valley Stream, N.Y.

#### **Servicing Gas Heating Controls**

"AGA GAS HEATING CONTROLS Service Manual" contains service instructions for various makes and models of gas heating equipment controls. It is designed for on-the-job use by warm air heating dealer-contractors and others concerned with adjusting, maintaining or repairing residential gas heating equipment. Material for text and illustrations was supplied by control manufacturers, who also reviewed the manual to verify accuracy and authenticity.

Contained in a loose leaf vinyl covered binder, the manual will be kept up to date with a periodical supplement to be supplied on a subscription basis. The manual in its present form contains 400 pages, is illustrated throughout with product photographs, cross sections, exploded views, charts and tables. The supplements will provide additional service instruction pages

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You'd give him the world, if you could. A free and happy world to learn in. A world of peace, where he can grow up, free of fear.

But peace takes more than wanting, these days. It takes a lot of doing, too. And peace costs money.

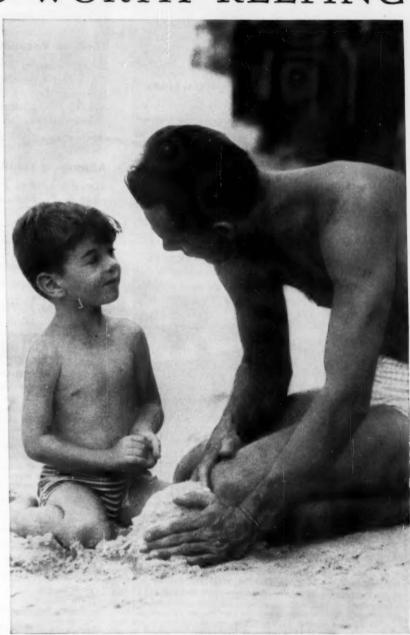
Money for strength to keep the peace. Money for science and education to help make peace lasting. And money saved by individuals, to keep our economy sound.

You can do something about this. Every U. S. Savings Bond you buy helps provide money for America's Peace Power—to help us keep the things worth keeping.

Why not buy a few extra, in the months to come?



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Photograph by Harold Halmo

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(Continued)

covering new makes and models of controls as the information becomes available from manufacturers.

Price of the manual without supplement service is \$5.50 per copy. Subscriptions for the three-year supplement service are \$4. Price of both manual and supplement service is \$9.50-Order Dept., American Gas Association, 420 Lexington Ave., New York 17.

#### **Heat Exchangers for Refrigerant Lines**

BULLETIN 160 covers heat exchangers for refrigerant suction lines. According to the company, the subcooling of the liquid improves expansion valve operation and the super-heating of the gas prevents "slugging" of liquid to the compressor. The heat exchangers are also said to eliminate sweating suction lines and save on insulation-Bohn Aluminum and Brass Corp., Betz Div., Danville, Ill.

#### **Direct Drive Blower Units**

DIMENSIONAL AND PERFORMANCE data on direct drive blower units with either center lock or standard double "Airotor" wheels are given in two four-page technical bulletins-Air Impeller Div., The Torrington Mfg. Co., Torrington, Conn.

#### **Heating and Air Conditioning Equipment**

POCKET SIZE CATALOGS, each 16 pages in length, cover 1) heating and air conditioning equipment, and 2) water heaters featuring "Jetglas" lining. Designed as sales aids, both bulletins are illustrated throughout with application and product photos-Day & Night Mfg. Co., 855 Anaheim-Puente Rd., La Puente, Calif.

#### **Furnace Vacuum Cleaners**

FOLDER illustrates and describes blower-vacuum cleaners, including portable units in 1-1/3, 3/4, 1/2 and 1/3 hp sizes; a heavy duty tank type model; and a drum unit. Also described are various attachments available -Ace-Sycamore, Inc., 448 DeKalb Ave., Sycamore,

#### **Aluminum Tubing**

ALUMINUM TUBING available in square, rectangular, round, oval and hexagonal shapes is described in a 48page catalog illustrated throughout with application photos. Included are tables showing typical properties of aluminum tube as well as resistance of alloys to various chemicals. One section of the book relates to the characteristics of aluminum tube from the standpoint of bending, joining, surface finishes, machining, sawing, drilling and piercing-Revere Copper and Brass Inc., 230 Park Ave., New York 17.



#### Continuous Type "K" **Gutter Machine**

. . to make your service more complete, Welty-Way has developed a continuous Type "K" gutter machine. It's another Welty-Way first and will enable you to make type "K" gutters, any length, quickly in aluminum, copper, galvanized or stainless steel it's simple to operate, may be mounted on a ½ ton pickup truck or a two-wheel trailer. This machine will be an asset to your shop . . . eliminates trips back . . . keeps your

Check the specifications and then write us.

#### Collar Attaching Machine — attaches collars to boots & fittings

A time and money saving machine to help you reduce working time considerably. In only one hour one man operating the WELTY-WAY Collar Attaching Machine will attach from 200 to 300 collars without preforming to boots and fittings of various forms ranging from 4" to 8". No preliminary crimping or beading is required and it takes approximately 10 minutes to change dies from one size collar to another.

This machine expands boot or fitting, grooves both collar and boot or fitting, and attaches collar to boot all in one operation. Production output on collar attachment is increased 300-400 per cent.

## ELTY-WAY Products, Inc.

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# Quickdraft... THE WORLD'S SAFEST POWER DRAFT UNIT FOR INDUSTRIAL, RESIDENTIAL AND INSTITUTIONAL EXHAUSTING



Provides air power for bulk materials handling!

Exhausts corrosive gases and abrasives!

Quickdraft provides industry, commerce, institutions and homebuilders power draft engineered for economical and efficient combustion regardless of building or atmospheric conditions. Models suitable for every heating or incinerator application . . . eliminate pulsating or chattering, puffing, smoking and sooting. Reduce building costs, no tall, unsightly stacks required. Quickdraft also provides industry with 1/4 inch to 60 inches W.G. static pressure for exhausting corrosive gases, abrasives and paint spray. Heavy-duty, high-pressure models, 6 inches to 30 inches diameter, are available for moving bulk materials or anything that can be moved by air. Because there are no motors, fans or bearings in exhaust line, only Quickdraft avoids costly clogging, corrosion of moving parts or fan failure.

#### IMPORTANT NOTICE

For withstanding corrosive gases, all Quickdraft units are available in standard acid resisting vitreous enamel, No. 316 Stainless Steel, rigid plastics (P.V.C.) and with plastic and Fiberglas coatings.



FANS OR BEARINGS IN EXHAUST LINE

Send for QUICKDRAFT ENGINEERING DATA on your application . . . now.

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# JACK HAMMER FAILS TO FLAKE INLAND TI-CO®

Crumbling concrete is easy with this powerful paving breaker. It hits with crunching impact at the rate of 1,200 blows per minute with 75,000 ft. lbs. of developed energy. Yet, while thousands of repeated blows actually hammered this TI-CO galvanized sheet into the ground at the point of contact, there wasn't a trace of flaking of the zinc coating!

TI-CO won't flake or peel on the job, either. It's soft enough to take the most complicated forming, and when you hammer it flat it doesn't spring back—it stays flat!

TI-CO sheets take Pittsburgh lock-seaming or any other tough fabricating process without your worrying about make-overs. You get a good-looking, long-lasting installation . . . every time! Ask your Steel Service Center for the TI-CO Brand . . . the galvanized sheet that's tailor-made for sheet metal work.





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## Contractor's Inter-Company Convention Spurs Growth

The key to future crowth lies in the development of managerial personnel, according to the Limbach Co., Pittsburgh mechanical contracting firm, which is engaged in a continuing program to increase the size and skill of its management team. At the company's third semi-annual management conference held recently at the Seaview Country Club near Atlantic City, Walter F. Limbach, president, reminded 18 top executives that "the development of human resources is a prime need and the execution of a development program is the responsibility of each of us as managers."

#### **Need More Managers for Growth Ahead**

Limbach Co.'s present expansion plans for its mechanical and metals construction activities include entry into several major city markets in the next 12 months. Sales in 1958, through the firm's branches in Pittsburgh, Columbus and Cincinnati, totalled \$19.5 million, and the budget in 1959 is in excess of \$30 million.

Mr. Limbach believes that the construction industry, including his own organization, has just scratched the surface in developing the managerial strengths required for the growing construction years ahead. "There is no doubt that men can be developed," he said. "There is only the question of how rapidly we can do it. In our

organization, during the brief period our management program has been in effect, we can note our development and the strengthening of those working with us."

#### **Authority Is Delegated**

Believing in a decentralized form of organization, the company delegates authority down the line, allowing managers at all levels to act promptly and to learn effectively from their experience. With such authority goes responsibility for performance, which is carefully spelled out in job descriptions for each key position.

Management conferences are held semi-annually by the company as one means of developing the skills of its managers. At the most recent conference, in three days of morning and evening meetings, the managers worked through a series of problem areas, learning from one another and collectively developing new ways of meeting and handling various management problems. During afternoons, on the golf course or out fishing, the managers continued to swap ideas.

William J. Keegan, treasurer, described effective techniques for analyzing the eleven operating and expense reports the firm currently has in use. Vice president Scott Limbach, manager of the mechanical division, and Kenneth C. Woodrow, manager of the metals division, then



# DODGE REPORTS uncover more...and better... bidding opportunities right in your own area

Many contractors are tied down by unreliable and incomplete information. They depend on gossip and rumors in locating new building projects, and on invitations to bid. This can be a costly, ineffective way to get business. Unnecessary, too. Because daily Dodge Reports give you the facts you need on bidding opportunities, when you need them.

You know what's coming up for bidding when you use Dodge Reports. You learn of many opportunities you might otherwise miss. You don't have to depend on gossip, rumors, or invitations to bid.

You concentrate on jobs you know will be profitable. Dodge Reports' reliable advance information helps you spot the new building projects that will do you the most good.

You learn who the general contract bidders are...who's bidding on major trades out for separate bids...and which ones get the contracts.

Dodge Reports are individual project reports. They're mailed to you daily. You get Reports only on the types of building you're interested in — in the area where you do business. They tell who's going to build what and where ... whom to see ... when bids are wanted ... and other pertinent facts.

If you do business anywhere in the 37 Eastern states, let us show you how *Dodge Reports* can help you uncover more – and better – bidding opportunities right in your own area.

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Yes, when you have a burner application, consult the POWER FLAME Catalogue FIRST. You'll discover a complete range of POWER FLAME models and sizes in atmospheric burners, power burners and combination burners. This flexibility fits your requirements to a T and saves countless hours of catalogue searching. Every POWER FLAME burner has been "torture tested" for maximum efficiency and dependability. You profit from low-cost installation and maintenance, too!

## Power Flame BURNERS



Write today for complete literature, information, and specifications on POWER-FLAME gas burners. Also get all the facts about THORO-MIX gas burners, and COMBI-MATIC dual fuel burners.

# Power Flame, Division, Inc. / GRANDVIEW, MO.

discussed the specific kinds of operating action that should be considered in reviewing each report.

William W. Berger, manager of the mechanical department at Cincinnati, led a discussion on the development of future sales plans based on forecasts of activity load.

A challenging problem for all contractors is the measurement of labor performance during the course of a job. Donald J. Mosshart, engineering manager of the mechanical division, used the experience of all conference participants in attempting to develop a system to "measure what you get done against what you spend for labor."

Some conference problems were referred to six-man teams who met privately and then reported their findings at general sessions. Each of three teams worked out suggestions for improving the "monthly review meetings" which are held by each department manager to analyze the activities of all branches of his management staff — sales, estimating, purchasing, engineering and production — in relation to each major job in progress. From these meetings, it is believed, will come tighter control of jobs in progress, better estimates on future jobs and more effective sales strategies.

Development of managers at Limbach Co. begins with an attempt to staff the organization with the most able people available. Selection programs begin at the apprentice level and include recruitment of graduating engineers at the college campus. Continued development takes place on the job at all levels throughout the organization.

- ALLEGHENY LUDLUM STEEL CORP. maintains a library of color motion picture films available for showings to associations, societies or business organizations. Films available include "Resistance Welding Stainless Steel," which covers spot, seam and projection processes, and "Stainless Steel", which shows the manufacture of stainless steel in the form of bars, plates, sheet, and strip and demonstrates the stain and corrosion resistance of the metal.
- ▶ THE PYLE-NATIONAL Co. has opened a new district sales office in Birmingham, Ala. The new office is located in the Comer Bldg., 2nd Ave. and 21st St., N.
- ▶ George W. Brown was recently elected president of Wagner Electric Corp. Mr. Brown will also serve as the company's chief executive officer. He joined the firm in 1926, served in various engineering capacities, and in 1952 was promoted to executive engineer. Later he was elected vice president in charge of manu-(Continued on page 148)

Cincinnati Elbows really get around

Corners and obstructions are no problem when you use Cincinnati Elbows. They're designed to pass around and over every type of obstacle. Shaped and tapered on fully automatic machinery, Cincinnati Elbows fit together perfectly, even on complicated jobs. Once installed, they look better and last longer, for they're hot-dipped after formation to give you a smoother, rust-resistant finish. So, next time specify Cincinnati Elbows. Available in all sizes, angles and gauges in copper, aluminum, stainless or galvanized steel. Ask your jobber today.



In the New York market ... where price is an important factor. and rigid building codes exist . . . **Empire Ventilators** outsell all others.



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Draft problems end with Walker Shur-Flo (Pats. Pend.), SUREST DRAFT SYSTEM ever devised for oil, coal or gas-fired installations from older homes to modern, low-roofed houses. Install it, forget it! What could be better?

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Now, the first ready-reference guide collecting all the information on Power Inducer Venting you'll need to solve your draft problems. You'll find it indispensable! Get your handy copy now! Absolutely no obligation.

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Fan-operated draft-inducer draws only flue gases not outside air. Quiet. Costs less to operate. Needs little power. Installs quickly at any angle. Virtually eliminates costly callbacks and corrections.

There's a Walker Braft Control for every draft problem regardless of fuel. 29,000,000 in use! The industry's standard of performance.

for larger special central heating



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JUNIOR LINE central heating budget SWING for gas-fired equipment VENTURI CAP for heating and ventilating

See your supplier or write direct to
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Contractors Report Savings up to 40%



# Use Miracle NP555 to seal spiral conduit and fittings Efficiently and Economically

Miracle NP555 is a specially formulated duct sealer with excellent aging properties, resulting from use of non-oxidizing raw materials. NP555 has been custom made to effect substantial economies for you—savings of up to 40% have been reported from many sheet metal contractors who have used this sealer!

NP555 Duct Sealer has excellent shelf life, and rarely has to be thinned. It's a pleasure to work with NP555 because of the mild solvents it contains. NP555 Duct Sealer creates a tenacious bond to metal, and provides a sure permanent seal around seams. Use NP555 between all sections of spiral conduits and fittings — between risers and run-outs — between run-outs and air conditioning units.

ON REQUEST: Send today for additional information!



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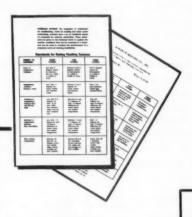
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# ...finding price competition tough?

ADVANCE THE SALE OUT OF THE "LOW PRICE" CLASS

by using American Artisan's

## STANDARDS FOR RATING HEATING SYSTEMS



This set of standards, presented in a series of 19 articles in American Artisan and developed by Professor S. Konzo of the University of Illinois, is the most effective sales promotion tool the industry has ever used to beat price competition for quality installations. They are condensed here to help you present the quality story to prospects. These standards are already being used successfully by many heating dealers.

#### STANDARDS CARDS MAY BE USED . .

- by salesmen as sales tools
- as direct mail pieces
- · as handouts at homeshows, fairs, etc.
- as showroom displays

Editors, American Artisan 6 N. Michigan Ave., Chicage 2, III.

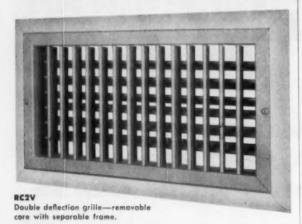
SEND ——— STANDARDS CARDS AT 2c EACH, (+25c service charge each package)

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### WATERLOO presents removable core grilles



RCNS "No-Site" inverted V shaped blades with removable core and separable frame.





RC3HD
Return air grille with fins fixed at 45° with removable core and

#### Completely removable cores — unique design separable frames

Designed to enhance all modern interiors, these new Waterloo removable core grilles offer many significant advantages:

- 1. Cores slip out easily—prevent damage to plaster or painted walls.
- 2. Unique design separable frames allow maximum free area. Trim radius edges of frames add streamline appearance to room decors.
- 3. Removable core grilles are either all aluminum construction or separable aluminum frames with conventional cores. Either type may be specified.
- 4. Waterloo removable cores are available with models shown or on any other Waterloo supply and return grilles or registers.

Reap these benefits by specifying Waterloo removable core grilles on your next job.

Write for new comprehensive Waterloo Catalog



WATERLOO REGISTER CO., INC.

WATERLOO, IOWA

facturing, engineering, purchasing and industrial relations. He was elected director of the corporation in 1956 and executive vice president in 1958.



SALES TRAINING FILM, "Dealer's Choice," drives home the point that the problem is not just to win, but to survive, a dilemma similar to that faced by many heating dealer-contractors today

- "Dealer's Choice" is the title of a half-hour, 16 mm sound motion picture produced by Day & Night Mfg. Co. and now available on a loan basis to associations and individual companies. Explaining the title, Frank Spratt, Day & Night sales manager, says: "Every dealer-contractor in the heating business today faces the same choice. He can sacrifice most of his margin to be low man on the price totem pole, or he can adopt a few simple, old fashioned selling principles which will keep his sales profitable and protect his profits, even against price cutting competition. We believe that survival in our industry depends on making the right choice." Earlier films based on subjects such as time payment selling and upgrading the sale are also available for loan.
- FOR THE SEVENTH CONSECUTIVE YEAR, T. B. Focke, president of National-U.S. Radiator Corp., presented four-year scholarships to selected high school graduates residing in communities where the company maintains manufacturing plants. Each year since 1953 the executives of the company have chosen outstanding high school graduates to receive assistance in order to provide more engineering graduates for industry.
- ▶ THE H. C. LITTLE BURNER CO. INC. has been elected to membership in the gas water heater and gas incinerator divisions of the Gas Appliance Manufacturers Association. The Little company has been a GAMA member for several years, participating in the association's direct heating equipment and floor furnace divisions. John V. Youngblood, general sales manager of the firm, is the company's delegate to GAMA.

WR-112

#### DURA-VENT THE SUPERIOR GAS VENT SYSTEM

FOR EVERY VENTING REQUIREMENT
The Most Complete Line

- 3 thru 20 inch pipe and fittings
- All U.L. LISTED



Now Dura-Vent can provide you with Type B vent pipe and fittings for any job — 3" thru 20". All Dura-Vent pipes and fittings are UL listed. You can be assured that Dura-Vent — the superior system — can meet all building code requirements for Type B vents, any architectural specifications.

WRITE TODAY FOR LITERATURE AND NAME OF NEAREST DIS-TRIBUTOR. TWO STRATEGICALLY LOCATED PLANTS FOR PROMPT SERVICE.



DURA-VENT

Affiliate of Peerless Manufacturing Div, of Dover Corporation Factory & Western Sales Office, 2525 El Camino Real, Redwood City, Calif. Factory & National Sales Office, 1400 W. Ormsby Ave., Louisville I, Kentucky



OVER 400
BURNERS
REPLACED WITH
THIS
FUEL
SAVER



#### O-BLAST ECONOMITE

#### POWER GAS CONVERSION BURNER

In the small home development of 472 homes in Marquette Heights, near Peoria, Illinois, illustrated above, Lo-BLAST Economite Power Gas Burners replaced oil burners originally installed. The reasons are evident when the trouble-free performance and economy of the Economite are considered.

Power burner design assures perfect combustion, regardless of natural draft conditions—saves an average of 10% in fuel—ideal for downdraft heating plants. The Economite burns so smoothly you can't tell when it's running.

Every Economite is factory-tested on gas and shipped assembled, fully equipped with foolproof safetys.

Lo-BLAST Power Gas Burners are available in capacities from 70,000 to 20,000,000 BTU input. Write for literature.

MID-CONTINENT
METAL PRODUCTS CO.
1960 N. Clybourn Ave., Chicago 14, Ill.

### There are many ways to save time on a job-

but none quite so sure as

#### NATIONAL



National Angle Rings can readily help you get the jump on time-consuming ring jobs. Because these rings are rolled accurately by experts to be uniform in curvature, they are guaranteed to be round. This means that there is no lost motion and costly fitting time required — in your shop, or on the job site.

And because National leg out rings are available in stock for immediate shipment, you gain days of time by using this on-the-floor warehouse service. No inventory of your own is ever needed. Last, but by no means least, is National's price list. Production runs, in all sizes, cut costs . . . allow National to quote you on stock prices rather than custom work. As it has so many others, it will pay you to investigate National today. Write for a stock list bulletin and price list.

#### Rings Rolled to Order

National rolls accurate rings to nearly any size, in all ductile metals. Phone, wire or write for a quotation on your requirements.



2138 South Sawyer Avenue, Chicago 23, Ill., Blshop 7-4255



GAFFERS & SATTLER'S new headquarters building includes such design features as glareproof windows, air conditioning, soundproofing, and an exhibit area for dealer-contractors

- ▶ UTILITY APPLIANCE CORP. recently opened a new headquarters building in Los Angeles which will house all executive and sales personnel of the Utility company and its Gaffers & Sattler brand product divisions. The new offices will use electronic equipment to process sales orders which will make it possible to transmit over 400 orders a day, the company states. To increase the efficiency of the service department, a two-way radio contact system will be employed, through which the service manager will be in constant contact with service trucks throughout the area.
- ▶ Welty-Way Products, Inc. has moved facilities for the manufacture of gutter machines and collar attaching machines to larger quarters in Cedar Rapids, Iowa. According to company officials, increasing sales and the development of new products necessitated the move to the new building which provides double the floor space and manufacturing capacity.
- ▶ BLACK & DECKER MFG. Co. launched its 50th year with a general sales meeting held at French Lick, Ind. Speakers on the program included Raymond G. Horner, vice president, marketing; Robert D. Black, chairman of the board and president; Alonzo G. Decker Jr., executive vice president; George W. McCarty, vice president, research and development; and Adam J. Quick, vice president, production.
- ▶ THE HART HEAT DIV., Avery Farm Machinery Co., has purchased the oil burner department of the Mt. Hawley Mfg. Co. Former Mt. Hawley models G-2 and G-4 will now be offered as Hart models G-2 and G-4 for small and medium sized project homes. Two larger sizes for commercial and semi-industrial use will be continued as Hart models G-6 and G-8. According to Earl K. and Lloyd F. Smith of Hart Heat, acquisition of the Mt. Hawley oil burner department will in no way affect the production and sales of Hart "HCM" series oil burners.



Less than 5 seconds on short and lighter pieces. Slightly longer on bulkier pieces

#### MAKES PERFECT DRIVE-CLEATS TOO!

The ONLY tool that does both. A complete drive cleating tool . . . no set-up time . . . no adjustments. Handy to take out to the job when not needed in the shop. Turns idle time into production time. Flanges any square duct up to 20 gauge. Quickly pays for itself in time, material and labor savings.

material and labor savi No. 12 Smith's Cleat Bender 12" Wide — 5 No. 18 Smith's Cleat Bender 18" Wide — No. 24 Smith's Cleat Bender 24" Wide — No. 30 Smith's Cleat Bender 30" Wide — Also Cleat Bending Brakes

140.00\* 170.00\*

\*F.O.B. Waukegan, Illinois Prices subject to change without notice



DRIVE CLEATS fit the duct without the use of a screwdriver TREMENDOUS SAVINGS in erection time and labor.

#### R. E. SMITH

1124 Elizabeth Avenue • Waukegan, Illinois



You pay less and get more features with speedy E-Z-ON damper regulators, because they're design engineered to do a better job . . . quicker.

Here's Proof: • Lower Price ... Means Lower Cost to You Double Prongs Mean Double-Grip . . . No chance of swiveling
 Washer is Permanently Attached . . . No loose washer to drop
or fall in pipe Modern "Swept" Wing Nut is Eye-appealing

... Adds new beauty to installations • Balanced Construction ...

Prevents possible binding of damper in duct.

all leading jobbers sta Stocked in Canada by THERMIDAIRE CORP

#### Cut ANY Shape in Metal...

### with a BEVERLY THROATLESS SHEAR!

 Make clean, knurl-free cuts in any metal to capacity

• High Carbon High-Chrome Blades

Built to last a lifetime



Here's What a Beverly Can Dol

Cuts made in 18 ga. metal with Model B-1

Beverly Shears are the most versatile metal shearing tools you can use. Unique shoulder design permits any cut . . . rack and pinion gives great power with little effort. Alloy steel body for maximum rigidity and strength. Made in 4 models.

Model 8-3 with Rall Hold Down

Write for illustrated circular —or see your Beverly Distributor.

#### Beverly SHEAR MFG. CO.

3020 W. 111th Street

Chicago 43, III.

Dwyer

A Complete Combustion Efficiency Test In 30 Seconds With the NEW, Low-Cost

DWYER COMBUSTION TEST KIT (No. 1100)

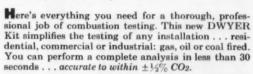
SIMPLE TO USE · LIFETIME ACCURACY PORTABLE

• COMPLETE • INEXPENSIVE

Includes:

Smoke Gage CO<sub>2</sub> Indicator Slide Rule Computer Draft Gage \* Magneclips Stack Thermometer Instructions

...and all necessary accessories and fittings



Handy, handsome metal kit-(also available with CO2 Indicator alone) - is custom-fitted for all necessary parts and accessories.

\*Draft Gage...famous DWYER Inclined Manometer. Continuously indicating type, permanently accurate choice of ranges: 0 to 1/4", 0 to 1/2", or 0 to 1" water.

Write for complete information

#### YER MFG. CO.

MICHIGAN CITY, INDIANA

#### wholesaler doings...

- THE NATIONAL ASSOCIATION OF WHOLESALERS recently published a booklet describing "Career Opportunities in Wholesaling," which is designed to attract young men to the wholesaling field. The association urges all wholesalers to help in the distribution of the booklet - to see that copies "are placed in the hands of every guidance counselor, in every public library, and in the libraries of every junior and senior high school and college in the country." The booklet is illustrated with pictures of wholesale operations throughout the country, many of them supplied by the Northamerican Heating & Air Conditioning Wholesalers' Association and the Robertson Heating Supply Co., Alliance, O. Much of the information presented is based on practices of wholesalers who are members of NHAW.
- ▶ Scott Wood & Metal, Inc., has been named a distributor of heating and air conditioning products in eight counties in northern Illinois by the Rybolt Heater Co. Scott Wood & Metal has offices in Aurora and Mendota, Ill.
- ▶ EUGENE SHIELDS has been appointed president of Sid Harvey of Western New York, Inc. Mr. Shields

was formerly vice president and general manager of Sid Harvey of Pennsylvania. He will have headquarters at 1290 Sheridan Dr., Buffalo, N.Y., a newly opened branch, and will direct sales of new and rebuilt parts for oil and gas heating equipment in the Buffalo, Niagara Falls and Rochester area. The company has also recently opened a branch in Patchogue, N.Y. This operation will be managed by Kenneth Hummel, formerly assistant manager at Babylon, L.I. Jack Deyo has been named president of Sid Harvey Sales Inc., Garden City, N.Y. Mr. Deyo joined Sid Harvey Inc., Valley Stream, as a salesman, later became sales manager. He has also served as branch manager in New Rochelle and Bridgeport, Conn. He started with Sid Harvey Sales at its formation in 1951 as vice president and general manager.

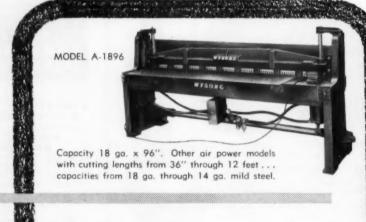
- ▶ GEO. F. WHEELOCK Co., warm air heating-sheet metal wholesaler of Birmingham, Ala., is now stocking collar attaching and gutter machines manufactured by Welty-Way Products, Inc.
- ▶ THE MAY Co., 413 S. Prairie St., Galesburg, Ill., has been appointed a distributor for the Rybolt Heater Co. and will handle the sale of gas, oil and coal heating equipment as well as air conditioning units. The May company also has offices and warehouse at 1611 3rd Ave., Moline, Ill.

#### WYSONG

AIR POWER and MOTOR DRIVEN

#### Squaring Shears

for unsurpassed accuracy in volume shearing





615 Fulton Street Greensboro, N. C.

"Buy a WYSONG . . . it's MILES ahead"



**MODEL 1452** 

Capacity 14 ga. x 52".

Other motor driven models with cutting lengths from 24" through 12 feet . . . capacities from 16 ga. through ½" mild steel.



SUSPENDED GAS FIRED FURNACES

priced to give you a competitive advantage in the commercial and industrial heating markets!

Another "First" for Shafconaire! A new line of suspended gas-fired furnaces designed right built right for commercial-industrial useand priced right, too, to give you profitable, volume sales! For these new Shafconaires actually cost less than any other type of gas heating equipment of equal capacity on the market today. What's more, they're covered by all required approvals for immediate installation.

#### 4 OUTSTANDING FEATURES for Profitable Volume Sales

- Power Burner-provides closer control of gases through heat exchanger-gives greater heating efficiency and lower heating costs.
- · Large Capacity-designed to handle greater volume of warm air at higher velocity-can be easily connected to duct work to provide controlled distribution of heat.
- Maximum Head Room-approved for installation two inches from combustible materials, compactly designed to assure greater clearance.
- Versatility-quickly, easily adapted in the field for right hand or left hand installation.



AVAILABLE IN 6 BASIC MODELS TO GIVE YOU BROAD MARKET COVERAGE 85,000 - 97,000 - 112,000 - 142,000 - 182,000 - 252,000 BTU Output

In addition to these six basic models, Shafconaire Gas-Fired Furnaces can also be supplied for duct heater applications. All models are furnished complete with power burner, blower, controls and with or without filters as desired.

#### Over Head Heaters, Inc.

Executive Offices: 1612 Book Bidg. . Detroit 26. Mich. . WO 2-4647 Branch Offices: New York - Chicago - Minneapolis

20 years exclusive experience in the design and manufacture of suspended heating equipment Up in the Air and out of the Way!

SHAFCONAIRE

SHAFCONAIRE-the Specified Line for '591 More national chain organizations have specified Shafconaire this year than ever before. So get your share of this profitable "pre-sold" volume—send coupon today for specifications and prices on the entire line of Shafconaire Suspended Furnaces.

OVERHEAD HEATE	RS, INC	1612 Book Bldg.	Detroit 26, Michigan
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Please send complete specifications and price information on your entire line of Shafconaire Suspended Gas-Fired and Oil-Fired Furnaces. We are □ CONTRACTORS □ JOBBERS □ DISTRIBUTORS

Company\_

Address City\_ Zone State

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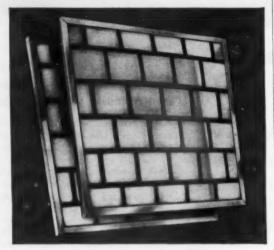
permanent low-cost

Dust-ban filter offers

bigger profits for you.

Bigger savings for

your customers!



SKUTTLE'S HIGH QUALITY DUST-BAN OFFERS ADVANTAGES FOUND IN AIR FILTERS COSTING TWICE AS MUCH.

Increase your profits from filter sales by selling the best package deal ever offered! The new Skuttle DusT-ban Air Filter provides the finest in permanent filtration at the lowest possible price! The savings to your customers continue for years after the initial purchase, because the DusT-ban is completely washable... no oiling necessary. Manufactured to give years of service, the DusT-ban is designed to remove the smallest particles ELECTROSTATICALLY, yet the wide open grill permits maximum air flow at all times. Write for descriptive literature today.

FILTER 16" × 20" × 1" 16" × 25" × 1" SIZES 20" × 20" × 1" 20" × 25" × 1" PRICE



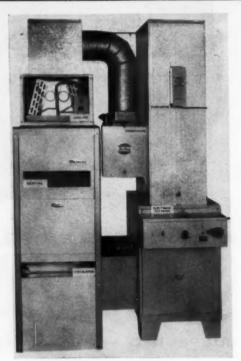
#### FREE

Check with your wholesaler on Skuttle's FREE filter gage offer.

As advertised in House & Garden and House Beautiful

Skuttle MANUFACTURING CO.

#### merchandising ideas



SEVEN STEPS TO COMFORT are demonstrated in this model display. Photographs of the display are used to help dealer-contractors close sales

A display that clearly shows the equipment needed to meet the requirements of the "Seven Steps to Indoor Comfort" has been built by James R. Scott, Air-Heet Corp., Chicago wholesaler. The display consists of a furnace (heat and air circulation), cooling coil (cooling and dehumidification), electronic air cleaner (filtering), humidifier (humidification), and a sterilizing lamp (air purification). The display is used to instruct dealer-contractors, either individually or in groups, in how to sell the benefits of a well-engineered indoor comfort system.

Photographs of the display are used along with a sales letter to explain to builders how to select a quality heating system for the houses they build. The letter also points out how this information can be put to use in selling the houses. One hard hitting paragraph reads:

"If you install the equipment shown in the attached photograph and your salesmen sell the results it will produce, your homes will be far more salable than the ones across the street that have only a heating plant."

Dealer-contractors using the photograph of the display as a sales piece for individual components find it helps to increase sales to owners of existing installations. One-dealer contractor who has consistently enjoyed a large humidifier volume was asked how he

### .. need a good DIRECT MAIL piece?

### ... use AMERICAN ARTISAN's MODERNIZATION CHECK-LISTS

#### CHECK-LISTS spell out to the prospect:

THERE IS NO REASON why every heating system cannot provide a "comfortable unawareness" that the equipment is operating. Often, the work required for a professional heating

man to improve or modernise existing systems is minor. Use of these check-lists will help him to determine how his system stacks up against the standards set for a "Good" system.

### 22 important check points for good heating performance; among these are:

- Is the furnace less than 15 years old?
  - Are room air temperature differences within 4 degrees between floor and ceiling when outdoor air temperature is 30 F?
    - Have service calls been rare during recent years?
      - Are fuel costs equal to those for similar houses in the vicinity?
- Are room air temperature differences within 2 degrees between all rooms (at comparable lecations)?
  - Does system include a humidifler?
    - Are occupied areas free from noticeable drafts?
      - Has furnace been checked for efficiency within past 12 months?

#### SPACE FOR A SALES LETTER BY THE DEALER-CONTRACTOR IS PROVIDED ON REVERSE SIDE OF CHECK-LISTS

Te: The Editors
American Artisan
6 Rt. Michigan Ave.
Chicage 2; Ill.

Please rush the following quantities:

Heating check-lists

Summer air conditioning check-lists

Sheet metal check-lists

Standards for Rating Heating Systems cards
Enclosed is my check for \$.... to cover reprinting casts.

(Please print)
Name

Company

Street Address

City and State

I am a dealer ... wholesaler ... manufacturer

THE HEATING, air conditioning and sheet metal check-lists published in the March American Artisan Mediernization issue can be used as direct mall pieces, for presentation by salesmen, as giveaway froms for home shows, etc. Dasigned to remind home owners of their modernization needs, the two-color check-lists are available at the following prices:

	tottowing price		
Quantity	Cost		
50	\$ 0.85		
100	1.35		
200	2.70		
300	4.05		
400	8.40		
500	6.75		
1000	13.50		
2000	27.00		
3000	37.00		
4000	48.00		
5000	59.00		

Standards cards are two cents each



johnson

**MELTING POT FURNACES** 

NO. 15 ----

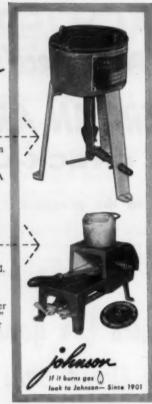
Melts 18-lb. lead capacity in under 10 min. Built to stand up under hard use. Has powerful No. 5, Type A Johnson Patented Direct Jet Bunsen Burner with shut-off valve and pilot libt. Height, 13". 13,000 B i U's per hr.

NO. 105-----Soldering and Melting

No forced air blast required. Cast iron pot capacity, 10 lbs. Two-burner unit doubles for heating soldering coppers up to 12 lbs. per pair. Firebox 334" by 4½" by 5½". 26,000 BTU's per hr. Length, 14".

WRITE FOR FREE JOHNSON CATALOG

JOHNSON GAS APPLIANCE COMPANY 540 E Avenue N.W., Cedur Rapids, Jawa



WHOLESALE CATALOG FOR RESALE DEALERS



Big-Name Brands

ELECTRIC MOTORS

(1/250 to 60-HP)

GENERATORS
BLOWERS
EXHAUST FANS
AIR CIRCULATORS
FAN PARTS
APPLIANCES
HEATING EQUIPT.
AIR COMPRESSORS
POWER TOOLS

PUMPS

GRAINGER'S

Electric

SUPPLY

SERVICE

Over 4000 Items Stocked

PROMPT DELIVERY. Warehouses and sales offices in 63 principal cities, coast-to-coast. All fully stocked for pick-ups or 24-hour shipping service.

SALESMEN at each sales office available for help and guidance.

180 PAGE CATALOG and buying guide. Includes detailed descriptions on over 4000 items. Lots of technical and application data.

WHOLESALE ONLY. Free net price catalog sent only when requested on letter-head. No consumer requests honored. O.E.M. prices available for quantity buyers.

WHOLESALE CATALOG
Write for Autumn Edition

W.W. GRAINGER, INC.

Dept. 2, 118 S. Oakley Blvd., Chicago 12



manages to close so many sales. He answered: "I show the prospects the photograph. I tell them about the humidifier and they buy it."

"What's the Comfort Index in your Home?" This is the question Perfection Industries, Div. of Hupp Corp., asks home owners in the furnace replacement promotion campaign now available to its dealer-contractors. The "Comfort Index" is a set of heating standards for use in rating homes as having "Top," "Passing" or "Poor" comfort. Points covered include uniform temperatures throughout all rooms, constant room air temperatures, warm floors, uniform temperature between floor and ceiling, humidity, cleanliness, quietness, correctly sized system, and economical operation.

In describing the market for furnace replacements, Stuart A. Smith, furnace sales manager, said: "No homes built before 1949-50 have perimeter warm air heating systems; half the 50 million homes in the U.S. have no central heating; and even many of the homes built since 1950 have poor heating systems — engineered not for comfort but for low prices. This market adds up to \$262 million according to our estimates."

Sales materials furnished to dealer-contractors are organized to help first target the prospects and then sell them. Newspaper ad mats, direct mail pieces and door hangers are packaged in a portfolio which serves as a wall or window banner when it is unfurled.

The campaign is built around the Home Comfort Index and all sales literature encourages prospects to call in their heating dealer-contractor for a free survey of their heating and cooling system needs. Cooperative newspaper ads urge customers to take advantage of the free survey offer. Direct mail pieces contain an addressed reply card that the home owner can use to request the survey. A second mailing piece stresses the need for a "Home Comfort Check-Up." Door hangers, which dealer-contractors can leave at older homes, also contain reply cards requesting the full scale survey.

Selling the customer begins when the dealer-contractor has been asked to survey a home heating system and he starts to fill in the survey form. He is aided in his sales approach by a set of instructions furnished by the company which tells him how to fill out the forms and get the customer to sign the order.

PUROLATOR PRODUCTS, INC., has designed a counter display, measuring 18 by 14½ in., presenting information on four new filter refills. The text points out that 98 percent of all oil burner filter replacements can be made with the four models displayed.

#### **CONTRACTORS!**

Here's the line designed for YOU



the complete line...completely dependable! All the thicknesses and weights you'll ever need



#### ASBESTOS PAPER:

A full range of thicknesses and weights. from 8 to 64 pounds per 100 square feet 18", 24" and 36" wide. 5 lb., 10 lb., 25 lb., 50 lb. and 100 lb. rolls.

#### ASBESTOS TAPE:

2 and 3 inch widths, 500 to 1500 foot packages. packed in cartons—eas use, no waste.



#### MILLBOARD:

Tough but not brittlethicknesses from 1/6" to -carton packed for protection until used.

#### AIR-CELL CORRUGATED:

1/4", 1/4", 1/4" and 1/4" thick with or without foil backing—37 wide rolls, packed in cartons.





#### DUX-SULATION:

The world's best duct insulation— ½" and 1" thick. Costs a little more. worth a lot more.

#### VIBRA-STOP:

The Metal/ Fabric flexible duct connection that stops noise. Two weights of metal, both canvas and asbestos types.



#### FLEXI-DUCT:

4", 6" and 8" widths of elvage edged flexible asbestos woven duct connectors. ow cost, meets Underwriters requirements.

#### FURNACE CEMENT:

Smokeless, odorless, acid proof and fireproof, from 1 pound cans to 100 pound steel drumsa perfect, permanent metal-to-metal seal.



#### COMBUSTION CHAMBERS:

3/4 to 12 gallons per hour—quick installation, maximum combustion efficiency and long life. THIS "BUYING & SELLING GUIDE" TELLS YOU EVERYTHING YOU NEED TO KNOW ABOUT ASSESTOS OF INSULAT. ING MATERIALS, GET A COPY FROM

YOUR WHOLESALER -IT'S FREE!

ASBESTOS and INSULATING MATERIALS

141 W. JACKSON BLVD. Dept. AA CHICAGO 4, ILLINOIS

#### INDEPENDENT

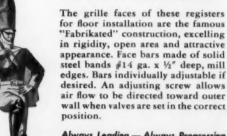
#### "Penimeter" REGISTERS



Two-piece design, solid back frame that does not require a stack head. The circulating air is evenly distributed in a fan-shaped pattern, so that it moves out and up closely paralleling the wall surface. Three sizes – for 21/4" x 10", 21/4" x 12" and 21/4" x 14" openings. Overall size 181/2" x 41/2". Base extension 31/8". Open area 23 sq. inches. Furnished in prime coat or Fabritone finish.



#### For Floor Installations



Always Leading — Always Progressing

INDEPENDENT REGISTER CO.

93rd STREET · CLEVELAND, OHIO



#### appointments . . .

▶ DR. FINN J. LARSEN as vice president in charge of research for Minneapolis-Honeywell Regulator Co. Dr. Larsen has been the company's director of research since 1953. As vice president he will continue to direct activities of the central research laboratories in Minneapolis and, in addition, will provide research program guidance for all the firm's divisions.





Finn J. Larsen

F. A. Johnson Jr.

- F. A. Johnson Jr. as assistant to the president of Duro-Dyne Corp. Mr. Johnson was formerly with David Levow of New York, where for the past seven years he has served as general manager. For several years Mr. Johnson has served as a delegate of the Merchandiser's Association, the auxiliary to the New York State Sheet Metal Roofing and Air Conditioning Contractors' Association, Inc., coordinating activities between the roofing, sheet metal, heating and air conditioning contractors of New York State and the technical salesmen serving those industries. In his capacity as assistant to the president of Duro-Dyne Corp., Mr. Johnson will work with Milton Hinden, the firm's president, functioning primarily in the marketing and merchandising phases of the business, and will act as coordinator between sales, production, development and research personnel.
- ▶ WILLIAM WELTY as vice president in charge of sales for Air Filter Corp. Mr. Welty has had over 16 years of experience in the air filter and electronic engineering field. As a sales and service engineer, he has worked with all branches of the government armed forces on special filters for the electronic field.
- ▶ P. H. GAUTHIER as contract sales manager for heating and air conditioning products for Perfection Industries, Div. of Hupp Corp. Mr. Gauthier was formerly with the Remington Corp. and before that was branch manager in the Kentucky-Illinois-Indiana area for Servel, Inc.
- WILLIAM P. UHLER as regional sales manager of the northeast-central region of Trion, Inc. Mr. Uhler will be in charge of sales of both residential and commercial electronic air cleaning equipment. He will have headquarters in McKees Rocks.

▶ CHARLES E. WARREN as manager of the Salt Lake City office of The Trane Co. Mr. Warren has been a salesman for the company since 1954. J. R. Patterson has been appointed manager of the firm's sales office in Dayton, O. William L. Baker Jr. has joined the Chicago sales office as a sales specialist on packaged air conditioning and heating products.







Robert H. Walker

- ▶ CHARLES C. LUND and Robert H. Walker as district sales managers for the Chicago plant of Joseph T. Ryerson & Son, Inc. Mr. Lund has been with the company since 1911. He became a sales representative in 1929 and for the past 30 years has served the Clearing Industrial District and surrounding territory. Mr. Walker joined the firm in 1946. For the past several years he has been working out of the company's Minneapolis district sales office.
- ▶ JOHN F. GRIFFEY as a sales engineer in the Midwest for Sundstrand Hydraulics, Div. of Sundstrand Corp. Mr. Griffey formerly served the eastern territory, working out of the district office in Summit, N. J. He will be responsible for sales and application engineering of fuel units. James R. Holmin, currently at the firm's Rockford headquarters, will handle sales of the division's products in all states on the Eastern Seaboard.
- ▶ E. L. Wehunt as Georgia sales representative for General Filters, Inc. Mr. Wehunt formerly was manager of the Crane Co.'s branch at Greensboro, N. C.
- AL W. KAUFMANN ASSOCIATES, New York City, as representative handling the sale of "Filtaire" kitchen range hood ventilators for Morrison Products, Inc. Kaufmann Associates will cover New York State and New Jersey. Other new representatives and their territories are: S. Stewart Cavin Associates, Baltimore Virginia, District of Columbia, Maryland, Delaware and parts of Pennsylvania and West Virginia; John Ott, Pittsburgh parts of West Virginia and Pennsylvania; W. B. Knox, Decatur, Ga. North and South Carolina, Georgia, Alabama and part of Tennessee; Charles Hanson, Miami, Fla. Florida and the Caribbean; C. Rollins Brown Jr., Jackson,





THE WORLD'S LEADING FURNACE CLEANER

TOTAL THE POLYER CLUB\* AND THERE BEG

Cleaner And Fills guesses to the action and fills

Reverables took and or well three for each fill action took and when a state for a series and fills

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Miss. — Arkansas, Louisiana, Mississippi and part of Tennessee; Hepner Air Filter Service, Inc., Cleveland — part of Ohio; Eaton Air Filter Service Co., Detroit — Michigan, except the upper peninsula; James F. Whisler, Chicago — Illinois (except Chicago), Indiana and Kentucky; Sol Segal, St. Louis — Missouri, Kansas, Iowa and Nebraska; Terrell J. Small, Fort Worth — Texas and Oklahoma.

- ▶ ROBERT L. FLEISCH as sales representative for Inland Steel Products Co. in the St. Louis metropolitan area. J. J. McCusker will cover Delaware and adjoining areas of New Jersey and Pennsylvania. R. H. Ditman and M. G. Hillegass will handle sales in Maryland and Virginia respectively. All of the new representatives will serve sheet metal and heating accounts. Two new sales representatives in the Chicago metropolitan area are T. J. LePage and F. R. Ruth, who will serve accounts in the heating and air conditioning field.
- ▶ THE WILLIAMSON Co., 7600 Greenfield Rd., Dearborn, Mich., as representative for National Modulation Co. The Williamson firm will handle the sale of "Palm Beach" modulating blower controls in the Detroit and southern Michigan area.



William J. Debler Sr.



William J. Debler Jr.

- ▶ WILLIAM J. DEBLER SR. and William J. Debler Jr., Needham, Mass., as manufacturers representatives in New England for the Field Control Div., H. D. Conkey & Co.
- HOWARD L. BOND JR., Birmingham, Mich., as Michigan representative for the Barber Mfg. Co. William L. Wilson, Brooklyn, will cover metropolitan New York and Long Island, and Thos. G. Jones, New Hartford, N. Y., will serve New York state exclusive of New York City. Paul Stack Sales Co., Charlotte, N. C., will represent the Barber firm in North and South Carolina.
- ▶ James R. Hillin as a field sales engineer for White-Rodgers Co. Working out of Atlanta, Ga., Mr. Hillin will handle sales and application of heating and air conditioning controls in Georgia, Florida, North and South Carolina.





### FREE

tells how

#### ANEMOTHERM Air Meter



#### saves in balancing air conditioning, heating and ventilating systems

The Model 60 Anemotherm Air Meter, developed by the Anemostat Corporation of America, gives you — in one convenient instrument — a simple, rapid method of balancing and checking any air system. It puts at your fingertips, by means of color-coded pushbuttons, air velocity, air temperature and static pressure. • The Anemotherm Air Meter pays for itself through time saved on only one major job. Write for Bulletin 55 giving all the facts.

AC 1338

ANEMOSTAT CORPORATION OF AMERICA

### ASSURES TIGHTEST POSSIBLE SOLDERED SEAMS

. . without any acids

. . . without any cleaning

. . . use 50-50 or 95-5 or other

soft solders with equal assurance



With LA-CO Flux you can be sure of sound, leak-free soldered jobs every time. Its modern formulation clears the way for a perfect alloying of solder and metal . . . and stretches your solder dollars too.

LA-CO Flux makes physical cleaning and sanding old-fashioned. All the muscle is built right in, yet it costs no more. It works right through metal oxides, oil and grease—definitely fluxes right through the chemical treatment coating on galvanized metals.

Yet, with all this self-cleaning power, LA-CO Flux is completely free of acids. It will not stain metals or injure workers . . . is safe for use with foodstuffs, oxygen lines, etc. LA-CO Flux (Regular) is used for soft soldering of copper, lead, galvanized iron, tin, zinc and other common metals. See for Yourself! Hack-saw a LA-CO Fluxed soldered job in half and see the perfect bond. Write on company letterhead for sample of LA-CO Regular Flux (Liquid).

There are other LA-CO Fluxes for all specialized needs . . . in liquid, paste or handy stick form. Flux problems: Let our laboratories help; no obligation, of course.

The Lake Chemical Co., 3072 W. Carroll Ave., Chicago 12, III.



#### PRESSURIZED

Fresh preheated air brought into the home under controlled conditions with the-



Field Tested in Flint, Michigan, for two years with over 500 satisfactory installations.

- Fresh Pre-Heated air supplies emple combustion air for economical furnace operation.
- Pressurizing home neutralizes infiltration and eliminates many of the drafts. "Cold" rooms are made more comfortable.
- Humidity content is normally increased making living in the home more enjoyable and healthier.
- Unpleasant edors from cooking and tobacco and harmful gases, such as carbon monoxide, disappear rapidly.

Simple installation — — over 200 in Flint were home-owner installed. Easy to handle — — less than 10 lbs. No service problem — — automatic control.

Write for further details on your business letterhead.

Protected dealerships available.

\*Patent Pending RYMCO, Inc. 1627 W. Fort St., Detroit 16, Michigan Mfgs. Reps. Wanted appointments

(Continued)

FRANK J. RAU as a sales representative for the Johnson Furnace Co. Before joining the Johnson firm, Mr. Rau was in the sales department of the Henry Furnace Co., covering parts of Ohio, Pennsylvania, West Virginia and Kentucky. He has had experience in assembly, shipping and service departments as well as in sales.





Erant I Day

Vernon Haug

- VERNON HAUG as a salesman in the Midwest territory for the Peck, Stow & Wilcox Co.
- ▶ BERWYN JOHNSON as a research engineer for Titus Mfg. Corp. Mr. Johnson will have headquarters in the firm's Air Distribution Research and Development Laboratory.

### "CORRECT PRACTICE in OIL HEATING"

NOW AVAILABLE TO YOU!

A complete reprint of the valuable series

by J. J. Mirabile

This practical series covers every angle of oil burner work, including arrangement of shop . . . stocking of parts . . . record-keeping . . . installation procedures . . . the handling of crews . . . how to make heating surveys . . . how to size combustion chamber . . . how to install thermostat . . . how to start the burner . . . how to use testing instruments . . . and how to operate a service department. It contains, as well, a complete list of causes and cures of oil burner troubles that will serve as a reliable guide in making service calls.

Every shop handling oil burner jobs should own this book. Full size, 8½ by 11 inches — 57 pages of practical helps. Send \$1.00 for a copy to the address below.

#### KEENEY PUBLISHING COMPANY

6 No. Michigan Avenue

Chicago 2, III.

### NOW... in individual cartons!

#### SCHAEFER FLUE BRUSHE

- No more pricked fingers or danger from rusted bristles.
- · Easier to display, merchandise and handle.
- Longer-wearing SILVER-BRITE RUSTPROOF WIRE or Black Tempered Wire.
- Every Carton clearly marked as to number, shape, size or specifications.
- Each and every brush in its own carton insures clean stock and eliminates re-wrapping.
- There's a correct Schaefer Brush for every industrial and domestic use.

Schaefer's special alloy "Silver-Brite" rustpoof spring steel wire has been developed for longer wear, more effective cleaning. Here's extra value, extra satisfaction in any brush and each is individually packaged for easier handling.

NO INCREASE

SCHAEFER BRUSH MFG. CO. 117 West Walker St.

Milwaukee 4, Wisconsin

Write for SCHAFFER Catalog on flue and furnace brushes, or for information on any special brushes for specific

#### BACHARACH PRESSURE GAUGE

- Body is transparent, high-strength plastic extrusion.
- Scale features easy readability; made of white plastic, with black scale divisions and numerals; 1/10" W scale divisions.
- Indicating Fluid of 1.9 specific gravity permits pressure readings to 1/10" W over entire scale on gauge of convenient size. Fluid is colored blue for visibility; is non-freezing to low temperature. Gauge is furnished filled ready for use.
- Shut-off Valves are conveniently opened or closed by rotation of knurled discs.
- Scale is adjustable up or down to permit direct reading of pressure.
- Blow-over seal automatically prevents spilling of fluid when gauge is subjected to pressure surges in excess of scale range.
- Body serves as reel for rubber hose.
- For convenient attachment of gauge to gas pipe an adjustable mounting clamp is available as optional accessory.

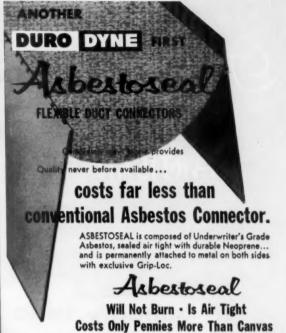
Ask your Jobber or write for Leaflet 830

BACHARACH INDUSTRIAL INSTRUMENT COMPANY 200 N. Bruddock Ave., Pittsburgh 8, Pa.

Gauge supplied with 4 ft. rubber hase and fitting for test connection.

Gauge with scale 0-7" W \$13.90 FACTORY NET Gauge with reversible scale — 0-15" W on one side, and 0-8.5 ounces per sa.

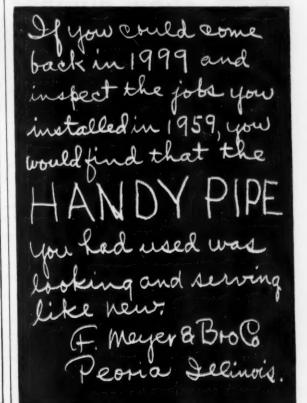
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Your Duro-Dyne Distributor stocks Asbestoseal... ASK ABOUT IT OR WRITE NOW FOR YOUR FREE SAMPLE AND DESCRIPTIVE FOLDER. Start saving money immediately by using the "ideal" "connector for furnace jobs.

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CENTRAL RESIDENTIAL AIR CONDITIONING

WARM AIR HEATING STREET METAL CONTRACTING

January 1960
directory
and
show number





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- An alphabetical listing of all products used in the field, and manufacturers of each.
- Names and addresses of all these manufacturers.
- A listing of all known trade names with the product and manufacturer identified for each.
- All products advertised in this issue are classified and listed. This guides readers to the ad pages where they'll find more information on what they seek.
- Normal editorial content of a regular issue assures immediate cover-to-cover attention.

Pulls a COMPLETE SHOW SECTION previewing the 2nd Southwest Heating and Air Conditioning Exposition in Dallas Feb. 1-4.

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Field's

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**since 1934** 

"Who makes it?"
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Regular space rates apply — not a 13th or extra-cost number. Parade your full line, tell a complete story to those who count, those who dominate in your field. Closing date, December 20. KEENEY PUBLISHING COMPANY, 6 N. Michigan Ave., Chicago 2, Ill.



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for a complete line of HANDY TOOLS AND EQUIPMENT

CLEAT DRIVE NOTCHER Handles up to 3" wide, 22 ga. or lighter. Hand or foot opera-tion. Mounts on bench, or on job with clamps, or bolts and



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Will give you hot soldering Iron in one minute—Solders eight hours for 10c—Right amount of heat—No changing of irons—Make your own fuel from water and carbide.

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AND QUIET

KEEP MOTOR

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SYSTEMS

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You can do two things to guard yourself against cancer: Have an annual health checkup. Alert yourself to the seven danger signals that could mean cancer: 1. Unusual bleeding or discharge, 2, A lump or thickening in the breast or elsewhere. 3. A sore that does not heal. 4. Change in bowel or bladder habits. 5. Hoarseness or cough. 6. Indigestion or difficulty in swallowing. 7. Change in a wart or mole. If your signal lasts longer than two weeks, go to your physician. Give him the chance to give you the chance of a lifetime.

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Operates in 1" of water.

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The Hampden Free Heat Reclaimer will blow heat to any room. Clamps outside smoke pipe, cannot affect draft. No tubes to soot up, no cleaning.

tubes to soot up, no cleaning.

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90° and 45° adjustable elbows, tees, thimbles, increasers and reducers. Manufactured to government specifications. Price and delivery information available on request.

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East Milton, Massachusetts



SO SOFT RUBBER KNEE PROTECTORS EVERY ROOME SHOULD HAVE A PAIR. PRICE \$2.50. ORDER YOURS TODAY.

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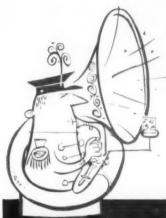
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Write Today for Catalog Kilgere, Inc., Westerville, Ohio

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See them at your H&C Jobber or write for complete information. H&C engineering data is accurate and absolutely reliable.

Month of the latest of the lat

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supplied in 2 ft. units (No. 472) and 4 ft units (No. 474)



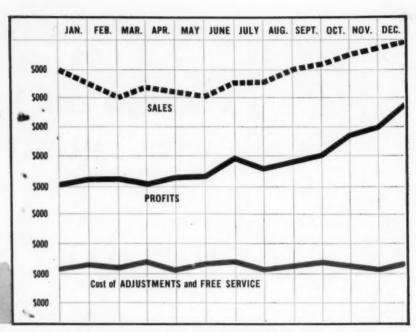
INDOOR COMFORT HART & COOLEY NUFACTURING COMPANY

500 EAST EIGHTH ST. . HOLLAND, MICHIGAN

IN CANADA: HART AND COOLEY MANUFACTURING CO., FORT ERIE, ONTARIO







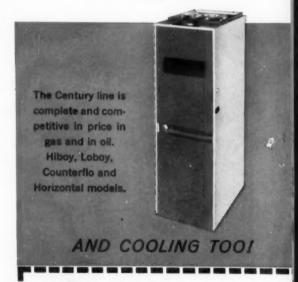
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Jerry Johnson, Sales Manager Century Engineering Corporation Cedar Rapids, Iowa

Sure, I'll look and listen for 7 minutes.

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